# RECORD OF DECISION

Operable Unit 1 of the
Wastebed B/Harbor Brook Subsite
of the Onondaga Lake Superfund Site

Town of Geddes, Onondaga County, New York

New York State Department of Environmental Conservation
and
United States Environmental Protection Agency
Region II
September 2018

## DECLARATION FOR THE RECORD OF DECISION

### SITE NAME AND LOCATION

Wastebed B/Harbor Brook Subsite of the Onondaga Lake Superfund Site
Geddes, Onondaga County, New York
Superfund Site Identification Number: NYD986913580
Operable Unit: 18

### STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency's (EPA's) selection of a remedy for Operable Unit 1 of the Wastebed B/Harbor Brook subsite (Subsite) of the Onondaga Lake Superfund site, chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300 (NCP). This decision document explains the factual and legal basis for selecting a remedy to address the contaminated soil/fill materials associated with the Subsite. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selected remedy is based.

The New York State Department of Health was consulted on the proposed remedy in accordance with CERCLA Section 121(f), 42 U.S.C. § 9621(f), and it concurs with the selected remedy.

### ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances at the Subsite, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

### DESCRIPTION OF THE SELECTED REMEDY

The selected remedy includes the following components:

- An enhanced cover system with vegetation enhancement. The cover system will consist of a minimum of 1-foot with up to 2-feet thick soil/granular cover (or maintained paved surfaces and buildings), based on anticipated site uses, applied over approximately 35 acres to minimize erosion and mitigate potentially unacceptable exposure of human and ecological receptors to constituents exceeding NYCRR Part 375 soil cleanup objectives (SCOs) in surface soil/fill material. The cover and/or the underlying soil material will meet the Resource Conservation and Recovery Act (RCRA) Subtitle D permeability standard.

- Vegetation enhancement to supplement the existing vegetation and reduce erosion. In areas where SCOs in surface soil, based on anticipated site uses, are not exceeded and where existing covers and/or soil fill material meet the Subtitle D permeability standard, vegetation enhancement will be implemented (approximately 21 acres) to supplement the existing vegetation and to reduce erosion of the surface soil/fill material.
- Construction/restoration of a wetland in the vicinity of wetland area WL2 on the northeastern shoreline of Wastebed B. The approximately 1-acre wetland construction/restoration will include the installation of a low permeability liner system beyond the wetland footprint within an area of dense non-aqueous phase liquid (DNAPL)-impacted soil/fill material to reduce infiltration and discharge of groundwater to surface water during seasonally high groundwater levels concurrent with high lake levels.
- An evaluation of the presence of DNAPL at the Penn-Can Property. Following the completion of a DNAPL investigation, if recoverable DNAPL is encountered, DNAPL would be recovered using deep recovery wells or other applicable methods.
- Address surficial tar material. Additional features (*e.g.,* stabilization, removal) will be incorporated, if necessary, in the areas where surficial tar material is present, such that this material is effectively addressed to meet the remedial action objectives.
- Institutional controls. Institutional controls in the form of environmental easements and/or restrictive covenants will be used to restrict the land use to commercial (including passive recreational)/industrial use, restrict groundwater use and require that intrusive activities in areas where contamination remains are in accordance with a NYSDEC-approved Site Management Plan.
- Continued operation and maintenance (O&M) associated with the Interim Remedial Measures (IRMs)[1] that have been implemented at the Subsite. The IRMs include the West Wall and Upper Harbor Brook groundwater collection systems and treatment at the Willis Avenue groundwater treatment plant and the existing capped areas addressed by the IRMs. Maintenance and monitoring of the Outboard Area IRM is included as part of Onondaga Lake Bottom Subsite monitoring. O&M of the East Wall IRM will continue pursuant to the 2011 NYSDEC and EPA *East Barrier Wall Interim Remedial Measure, Response Action Document*. Surface water monitoring in Harbor Brook and Subsite ditches will also continue under the Upper Harbor Brook IRM. Maintenance and monitoring for the IRMs will include monitoring to document that established criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance or reapplication of vegetation, as necessary.

[1] An IRM is an activity that is necessary to address either emergency or non-emergency site conditions, which in the short-term needs to be undertaken to prevent, mitigate, or address environmental damage or the consequences of environmental damage attributable to a site.

- Monitored natural attenuation (MNA) of shallow/intermediate groundwater at the point of compliance.

The Subsite is part of a waste management area (WMA) because the waste is a solid waste containing contaminants of concern and will meet the requirements for containment under RCRA Subtitle D. The vertical hydraulic conductivity of the Solvay waste unit present at the Subsite is generally less than 1 x $10^{-5}$ centimeters per second (cm/sec) (and the geometric mean of the vertical hydraulic conductivity is less than 1 x $10^{-5}$ cm/sec). The cover materials in combination with the underlying soil/fill material (*e.g.,* Solvay waste) and continued O&M of the groundwater collection and treatment system for Subsite groundwater will meet the requirements for containment under RCRA Subtitle D.

The remedy includes the restoration of shallow/intermediate groundwater at the WMA's point-of-compliance via MNA. Based on multiple lines of evidence, degradation of organic constituents is occurring in the shallow and intermediate ground water via natural attenuation and degradation (*e.g.,* biodegradation). Further evaluation of MNA will need to be conducted as part of the preliminary remedial design and/or O&M.

Sampling will be performed, as necessary, to determine the appropriate cover in various areas of the Subsite.

The need for a demarcation layer between the soil cover and the underlying substrate will be evaluated during the remedial design.

The cover system and vegetation enhancements will require routine maintenance and inspections to maintain cover integrity.

Fill material brought to the Subsite will need to meet the requirements for the identified Subsite use (commercial, industrial, or ecological). Native species will be used for the vegetative component of covers. To develop cost estimates, the seed application is anticipated to consist of a grassland seed mix native to New York State and selected for its ability to attain relatively high growth rates and ecological function.

Pavement, sidewalks, or structures, such as buildings, that are part of future development can serve as acceptable substitutes for any of the vegetated cover types described above.

Clean fill staging areas, which supported the noted IRMs and the Onondaga Lake site remediation projects, have been constructed at the Subsite. Restoration and final cover thicknesses will be evaluated, and existing cover thickness may be supplemented with additional cover material to meet the minimum thickness required for the identified use.

Evidence of DNAPL and stained soils were encountered in soil borings and test pits advanced during the investigations at the Subsite. While DNAPL migration is currently being addressed by IRMs, a pre-design investigation will be conducted to evaluate the potential for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property. Following completion of the DNAPL investigation, if recoverable DNAPL is identified, DNAPL will be recovered using recovery wells.

Because development plans have not been determined for portions of the Subsite, the boundaries of the cover types are conceptual and presented for cost estimation purposes. A portion of the Penn-Can Property is anticipated to be used for overflow parking for the New York State Fairgrounds, while an approximate ¾-mile extension of the "Onondaga Loop the Lake" trail will cross a portion of the Lakeshore Area and Additional Area of Study #1. The extent, thickness, and permeability of covers will be determined during the design phase and/or during site management, if site uses change, as necessary.

The environmental benefits of the selected remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy[2] and NYSDEC's Green Remediation Policy.[3] This will include consideration of green remediation technologies and practices.

## DECLARATION OF STATUTORY DETERMINATIONS

### Part 1- Statutory Requirements

The selected remedy meets the requirements for remedial actions set forth in CERCLA in Section 121, 42 U.S.C. § 9621, because as implemented : 1) it is protective of human health and the environment; 2) it meets a level of standard of control of the hazardous substances, pollutants, and contaminants which at least attains the legally applicable or relevant and appropriate requirements under the federal and State laws; 3) it is cost-effective and 4) it utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

### Part 2- Statutory Preference for Treatment

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances as a principal element (or a justification for not satisfying the preference). Under the selected remedy, contaminated groundwater and, as feasible, DNAPL will continue to be collected through implementation of the West and East Wall IRMs and undergo treatment at the Willis Ave groundwater treatment plant. Under the selected remedy, any NAPL collected under the Harbor Brook IRM will be shipped offsite to a permitted facility for treatment/disposal. Also under the selected remedy, a pre-design investigation will be conducted to evaluate the potential for the presence of recoverable DNAPL in the deep unit on the Penn-Can

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[2] See http://epa.gov/region2/superfund/green_remediation

[3] See http://epa.gov/region2/superfund/green_remediation/ and http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

Property. Following completion of the DNAPL investigation, if recoverable DNAPL is identified, DNAPL will be recovered using recovery wells. Any recovered DNAPL will be shipped offsite to a permitted facility for treatment/disposal. The selected remedy also includes additional features (*e.g.,* stabilization, removal), if necessary, in the areas where surficial tar material is present on the Penn-Can Property, such that this material is effectively addressed to meet the remedial action objectives. With respect to other areas where Solvay waste and contaminated soil/fill materials are present at the Site, NYSDEC and EPA do not believe that treatment is practicable or cost effective given the widespread nature of the Solvay waste and soil contamination and the high volume of Solvay waste and soils that are present.

**Part 3- Five-Year Review Requirements**

Because this remedy is anticipated to result in hazardous substances, pollutants, or contaminants remaining on-Subsite above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

## ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for Operable Unit 1 of the Wastebed B/Harbor Brook Subsite.

- Contaminants of concern and their respective concentrations (see ROD, pages 11-18 and Appendix II, Tables 1, 2 and 3);
- Baseline risk represented by the contaminants of concern (see ROD, pages 25-33);
- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD, Appendix II, Tables 1, 2 and 3);
- Manner of addressing source materials constituting principal threats (see ROD, page 52);
- Potential land and groundwater use that will be available at the Subsite as a result of the selected remedy (see ROD, page 24);
- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are projected (see ROD, page 39 and Appendix II, Table 8); and
- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (see ROD, page 53).

**AUTHORIZING SIGNATURES**

Michael J. Ryan, P.E., Director
Division of Environmental Remediation
NYSDEC

9/28/18
Date

Angela Carpenter, Acting Director
Emergency and Remedial Response Division
EPA, Region 2

9.28.18
Date

**RECORD OF DECISION FACT SHEET**
**EPA REGION II**

**Site**

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|---|---|
| Site name: | Operable Unit 1 of the Wastebed B/Harbor Brook Subsite of Onondaga Lake Site |
| Subsite location: | Geddes, Onondaga County, New York |
| Site HRS score: | 50.00 |
| Listed on the NPL: | December 16, 1994 |

**Record of Decision**

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| Date signed: | September 28, 2018 |
| Selected remedy: | Installation of one- to two-foot thick cover system where shallow soil concentrations are above NYCRR Part 375 Soil Cleanup Objectives for ecological, industrial, or commercial use; vegetation enhancement; and wetland construction/restoration with a low permeability cover. The remedy also includes the performance of a Preliminary Design Investigation and dense non-aqueous phase liquid (DNAPL) evaluation, following which recovery will be performed on a portion of the Subsite if recoverable DNAPL is identified. In addition, a 1-foot thick soil/granular cover or asphalt will be installed and other actions will be performed (*e.g.,* removal, stabilization), if necessary, in the areas where surficial tar material is present, to provide long-term isolation of underlying impacted soils. A Site Management Plan and institutional controls will also be included. |
| Capital cost: | $11.8 million |
| Annual operation and maintenance cost: | $586,000 |
| Present-worth cost: | $19.1 million |
| **Lead** | NYSDEC |
| Primary Contact: | Tracy Alan Smith, Project Manager, (518) 402-9676 |
| Secondary Contact: | Donald Hesler, Section Chief, (518) 402-9676 |

**Waste**

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|---|---|
| Waste types: | Volatile organic compounds, semi-volatile organic compounds, pesticides, polychlorinated biphenyls, polychlorinated dibenzo-p-dioxins, and inorganics |
| Waste origin: | Local waste disposal activities |
| Contaminated media: | Soil and groundwater |

# DECISION SUMMARY

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# Contents



ATTACHMENTS

## SUBSITE NAME, LOCATION, AND DESCRIPTION

On June 23, 1989, the Onondaga Lake site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites. On December 16, 1994, Onondaga Lake, its tributaries, and the upland hazardous waste sites which have contributed or are contributing contamination to the lake (subsites) were added to the U.S. Environmental Protection Agency's (EPA's) National Priorities List (NPL). This NPL listing means that the lake system is among the nation's highest priorities for remedial evaluation and response under the federal Superfund law for sites where there has been a release of hazardous substances, pollutants, or contaminants as defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund).

Since many Superfund sites are complex and have multiple contamination problems and/or areas, they are often divided into several operable units (OUs) to manage the site-wide response actions. CERCLA's implementing federal regulations, known as the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), at Section 300.5 defines an OU as "a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into several OUs, depending on the complexity of the problems associated with the site. [OUs] may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site."

The New York State Department of Environmental Conservation (NYSDEC) and EPA have, to date, organized the work for the Onondaga Lake NPL site[1] into discrete subsites. Many of these subsites are also considered by EPA to be OUs of the NPL site. One of the subsites is Wastebed B/Harbor Brook Subsite. In 2000, Honeywell and NYSDEC entered into an Administrative Consent Order (ACO) to conduct a remedial investigation/feasibility study (RI/FS)[2]. The RI/FS for OU1 of the Wastebed B/Harbor Brook Subsite (Subsite) has been completed. The selected remedy described in this Record of Decision (ROD) addresses soil/fill material[3] and shallow and intermediate groundwater at the Subsite.

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[1] The Onondaga Lake Superfund Site's Superfund Site Identification Number is NYD986913580. NYSDEC is the lead agency; EPA is the support agency.

[2] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks. An FS identifies and evaluates remedial alternatives to address the contamination at a site.

[3] Portions of the Site were historically used for the deposition of Solvay waste, an inert material consisting largely of calcium carbonate, calcium silicate, and magnesium hydroxide. The term "soil/fill material" throughout this document refers to Solvay waste and the overlying fill materials (*e.g.*, cinders, gravel, crushed limestone, fly ash, silt, and clay).

The 90-acre Subsite, which is located south of Onondaga Lake in the Town of Geddes and the City of Syracuse, New York, includes the Lakeshore Area (including Wastebed B, the former East Flume, Dredge Spoils Areas [DSAs] #1 and #2, and the Interstate 690 [I-690] Drainage Ditch), the Penn-Can Property, the Railroad Area, Additional Area of Study (AOS) #1, AOS #2, and Harbor Brook. A wetland area, designated SYW-12, is also part of the Subsite. See Figure 1, Site Location. The SYW-12 area was not evaluated in the FS cited above, but it will be addressed in a future FS (OU2 of the Wastebed B/Harbor Brook Subsite).

The Lakeshore Area and Penn-Can Property are fenced. The only building present on the Subsite is a pump station to convey groundwater to the Willis Avenue groundwater treatment plant (GWTP). The former Penn-Can Property buildings were previously demolished (see Figure 2). Surface water drainage structures and storm sewers related to I-690 are also present. A Site Plan can be found on Figure 3.

## SUBSITE HISTORY

Lakeshore Area

Historical use of Wastebed B was for the deposition of Solvay waste. In approximately 1898, the filling of Wastebed B was initiated by the construction of wooden bulkheads in the lake and placement of Solvay waste out to the bulkhead line. Wastebed B received Solvay waste until approximately 1926. Coke plant waste from the former AlliedSignal Main Plant (located south of the Willis and Semet Subsites, see Figure 1) may have been disposed of concurrently with the Solvay waste. Additionally, sewage sludge from the Syracuse Metropolitan Wastewater Treatment Plant was disposed of on the southeast portion of Wastebed B in the late 1950s and early 1960s. Modification of the Onondaga Lake shoreline has occurred as a result of erosional and depositional forces, as well as historical discharges from the former East Flume.

The East Flume was originally an excavated drainage ditch that received process cooling waters from the former Main and Willis Avenue Plants. In addition to cooling waters, the East Flume also carried a combined waste stream (Solvay, sanitary, mercury, and organic) from the Main and Willis Avenue Plants to Onondaga Lake. The East Flume historically received storm water from Solvay Paperboard, General Chemical Corporation, Landis Plastics, and the Village of Solvay. It also received process waters from the Trigen Syracuse Energy Corporation. Water depths within the flume typically ranged between 2 feet and 6 feet, and channel width varied approximately from a minimum of 20 feet to a maximum of 150 feet.

Penn-Can Property

In 1919, the Barrett Division of the Semet Solvay Company of Allied Chemical Corporation (a predecessor of Honeywell) began operations. Barrett produced various asphalt emulsions and some coal tar-based products used in road construction (*i.e.,* asphalt tar materials). The primary constituents of these materials were asphalt, coal tar, caustic soda, and muriatic acid. Until 1975, the operation included a barge loading facility, which transferred emulsions to vessels on Onondaga Lake via above ground pipelines. These pipelines were removed, along with the aboveground storage tanks, during the 1978 decommissioning of the Barrett facility. In 1978, approximately 750 cubic yards (cy) of asphalt tank bottoms were buried on the property in a pit. The tank bottoms were covered with 2 feet of low permeability fill, a geotextile, and 2 feet of fill. The pit was subsequently covered with a layer of crushed stone. The locations of historic tanks and structures and the approximate location of the pit are shown on Figure 2. In 1983, the property was purchased by Penn-Can Road Materials, Inc. Until recently, the property was being used by Spano Container Corporation for the storage of equipment, and fill material of unknown quality was placed on the southern portion of the property (see "Penn-Can Property Fill" on Figure 2). The buildings on this property were demolished in October 2013, and Honeywell purchased the property in November 2013. This area is currently being used to support the Wastebeds 1-8 subsite IRM construction efforts, with imported stone and soil materials being stored on the property. The Penn-Can Property drainage ditch and wetland areas were remediated as part of the Upper Harbor Brook Interim Remedial Measure (IRM)[4]. Localized areas of surficial tar, likely associated with the buried tank bottoms, were observed on the Penn-Can Property during Summer 2017.

Railroad Area

While a review of historical aerial photographs indicate that the property has been vacant and has not been used for production purposes, Solvay waste was observed in subsurface borings in the northern portion of the Railroad Area. Subsequent to the RI investigation, the area's ditches, associated wetlands, and the length of Harbor Brook along the Railroad Area were remediated as part of the Upper Harbor Brook IRM.

AOS #1

Based on review of historical aerial photographs, AOS#1 (see Figure 3) is a floodplain

[4] The use of the term "Interim Remedial Measure" throughout this document is not intended to mean that this removal action is a "remedial action" as that term is defined in the federal law, CERCLA. An IRM is an activity that is necessary to address either emergency or non-emergency site conditions, which in the short-term need to be undertaken to prevent, mitigate, or remedy environmental damage or the consequences of environmental damage attributable to a site. An IRM is equivalent to a non-time critical removal under the CERCLA removal program pursuant to 40 CFR Section 300.415(b)(2).

created by the deposition of Onondaga Lake and Harbor Brook sediments from dredging during the 1950s and 1960s. There is also evidence that non-Solvay waste fill was likely placed there during this time. Subsequent to the RI investigations and as part of the East Barrier Wall IRM, the lower portion of Harbor Brook was rerouted through AOS #1, and a vertical sheetpile barrier wall and collection system were installed through AOS #1.

<u>AOS #2</u>

AOS #2 is situated east of Harbor Brook and south of I-690, between Harbor Brook and the western dike of Wastebeds D and E (see Figure 3). Aerial photographs indicate that Wastebeds D and E were inactive by 1926. Several buildings were constructed on the eastern end of Wastebed D between 1959 and 1966. Currently, the eastern end of Wastebeds D and E is occupied by multiple car dealerships. The Wastebed D/E Drainage Ditch on AOS #2 was remediated as part of the Upper Harbor Brook IRM.

<u>Harbor Brook</u>

Under the East Wall IRM, Upper Harbor Brook IRM, and Outboard Area IRM (see IRM details below), the lower portion of Harbor Brook (see Figure 3) was remediated and rerouted through AOS #1.

<u>Mitigation Wetlands</u>

A total of 16.3 acres of delineated jurisdictional wetlands were at one time present on the Subsite. Remediation efforts completed associated with the Onondaga Lake Bottom remedy, as well as upland remedies, including the IRMs discussed later in this document, impacted portions of these wetlands. As a result, additional wetlands were constructed at the Wastebeds 1-8 Subsite.

As part of Onondaga Lake maintenance and monitoring, a comprehensive plan was developed to ensure that wetland mitigation requirements along the Onondaga Lake shoreline are met.

***Interim Remedial Measures***

Various IRMs have been implemented at the Subsite. The IRMs described below were primarily performed to prevent the migration of dense non-aqueous phase liquid (DNAPL) and/or contaminated groundwater to Harbor Brook and Onondaga Lake. In addition, contaminated soil/fill material from these IRMs were excavated and placed on Wastebed B. These soil/fill materials were then graded, covered, and seeded under the

*Wastebed B Materials Management, Grading and Disposal Plan*[5]. The IRMs are presented on Figure 4 and consist of the following:

- East Flume IRM (and Abandonment of 42-inch Picric Acid Sewer) – This was performed as an IRM under the adjacent Willis Avenue Subsite. The IRM activities included the construction of a 48-inch outfall pipe and redirection of storm water and process water flow that discharged to the East Flume directly to Onondaga Lake (the East Flume was subsequently removed/backfilled under IRMs discussed below). In addition, a historical sewer that traversed the Willis Avenue Subsite and discharged to Onondaga Lake was rerouted around the Subsite and redirected into this 48-inch outfall. Approximately 1,500 cy of soil excavated[6] during construction of the East Flume IRM was placed on Wastebed B and managed under the *Wastebed B Materials Management, Grading and Disposal Plan*.

- West Barrier Wall IRM – This IRM included the construction of a subsurface sheet pile barrier wall and groundwater collection system from the eastern end of the Willis Avenue/Semet Tar Beds (Willis/Semet) IRM Barrier Wall to the western bank of Lower Harbor Brook. The purpose of the West Wall IRM was to eliminate, to the extent practicable, the discharge of contaminated groundwater and non-aqueous phase liquid (NAPL) (and collect NAPLs, as feasible) into Onondaga Lake. Grading, backfilling, and restoration of portions of Wastebed B followed the installation of the barrier wall and groundwater collection system. This IRM is also part of a larger groundwater collection and treatment system consisting of the Willis/Semet IRM and the Wastebed B/Harbor Brook East Wall IRM to address area groundwater. Approximately 37,250 cy of material removed during West Wall IRM construction was placed and managed on Wastebed B consistent with the *Wastebed B Materials Management, Grading and Disposal Plan*. In addition, portions of the East Flume were backfilled as part of this IRM.

- East Barrier Wall IRM – The East Wall IRM response action was selected in the 2011 East Barrier Wall Interim Remedial Measure, Response Action Document

[5] Excavated materials from IRMs conducted at the Site were placed on Wastebed B in a designated placement area based on the source of the excavated material and were managed under the *Wastebed B Materials Management, Grading and Disposal Plan*. Subsequent to final placement, these materials were graded and covered with two feet of clean material (approximately 18 inches of low permeable material and six inches of topsoil) and seeded with native plant species. The placed materials and cover extend over an approximate 12-acre area on Wastebed B ("Staged Material" area on Figure 4).

[6] The materials from this and other IRM's discussed below were sampled to determine if they were non-hazardous and could be managed on-Subsite. These materials were consistent with remaining site-related material and are evaluated under this ROD.

(RAD). That IRM included the construction of a subsurface sheet pile barrier wall and groundwater collection system from the eastern end of the West Wall, crossing Harbor Brook, and extending northeast along the lakeshore for approximately 1,150 feet. The purpose of the East Wall IRM is to eliminate, to the extent practicable, the discharge of contaminated groundwater and NAPL (and collect NAPLs, as feasible) into Harbor Brook and Onondaga Lake. The East Wall IRM included the following:

- Temporary rerouting of a section of Lower Harbor Brook including excavation of the new channel and backfilling of the former channel.
- Replacement of a downstream culvert located in Harbor Brook.
- Installation of the sheet pile barrier wall and groundwater collection system.
- Placement of approximately 8,700 cy of material on Wastebed B consistent with the *Wastebed B Materials Management, Grading and Disposal Plan*.
- Restoration of impacted areas.

The rerouted section of Lower Harbor Brook was temporary. The final restoration of Lower Harbor Brook was included as part of the lake capping and dredging project and performed in accordance with the lake-wide plan for habitat restoration. This IRM is also part of a larger groundwater collection and treatment system consisting of the Willis/Semet IRM and the Wastebed B/Harbor Brook IRM to address area groundwater. In 2015, the East Wall Collection Trench Optimization project to reduce infiltration of water into the collection system during rainfall events and high lake levels was completed. This work included the following:

- Grading and installation of a minimum 2-foot of clean clay/soil cover over 2.2 acres.
- Installation of approximately 870 linear feet of clay liner along the barrier wall extending from the barrier wall inland to the access pathway.
- Extension of the access pathway approximately 900 linear feet.
- Restoration of approximately 2.0 acres with topsoil, mulch, and seeding to establish grassland cover.
- Raising electrical utility man ways, piezometers, vaults, and cleanouts to the proposed grade.
- Installation of additional cleanouts on the groundwater collection system force main.
- Installation of protection for the existing inclinometers on the barrier wall.

- <u>Upper Harbor Brook IRM</u> – The Upper Harbor Brook IRM included the following:

  - Installation of three groundwater collection trench sections adjacent to Harbor Brook to prevent the discharge of contaminated groundwater to Harbor Brook.

- Excavation of sediments, installation of a geomembrane liner or concrete, and restoration of the substrate in open water (OW) areas OW-1, -2, -3, and -4 in Harbor Brook.
- Cleaning of Culvert 5 in Harbor Brook and two culverts in Railroad Ditch-1 and -2. Cleaning and sealing of Culverts-2, -3 (east and west), and -4 in Harbor Brook.
- Excavation of sediments from the I-690 Drainage Ditch, Penn-Can Property Drainage Ditch, Wastebed D/E Drainage Ditch, Railroad Ditch-1 and -2, and restoration of the ditch substrate.
- Installation of a geomembrane liner and groundwater collection trench beneath the I-690 Drainage Ditch.
- Installation of 150 feet of geomembrane liner under the downstream section of the Wastebed D/E Drainage Ditch (starting at OW-3).
- Excavation of sediments from Penn-Can wetland areas WPC1, WPC2, and WPC3, and restoration of substrate. These areas were not restored as wetlands.
- Excavation of sediment and restoration of substrate in Railroad Area wetlands WRR1, WRR2, WRR3, WRR4, WRR5, and WL6, with WRR1, WRR2, WRR3, and WRR4 expanded to provide compensatory acreage for the WPC1, WPC2, and WPC3 areas lost from the Penn-Can property.
- Cleaning and video inspection of sections of the I-690 storm sewer conveyance system that discharges to the I-690 Drainage Ditch.
- Installation of a passive NAPL collection system in OW-1, 3, and 4.
- Placement of approximately 40,000 cy of excavated material generated during construction of the Upper Harbor Brook IRM on Wastebed B consistent with the *Wastebed B Materials Management, Grading and Disposal Plan*.

The purpose of the Upper Harbor Brook IRM was to eliminate, to the extent practicable, the discharge of impacted groundwater and NAPL into Harbor Brook and Onondaga Lake, and collect NAPLs as feasible.

<u>Outboard[7] Area IRM</u> – The Outboard Area IRM response action, which was selected in the 2012 Outboard Area Interim Remedial Measure RAD, included the removal of contaminated soil and sediments and the placement of an isolation cap (including portions of the East Flume), which achieved final grades lower than the existing grade elevations to facilitate habitat restoration. Based on the anticipated cap thicknesses and target final grades for the western and eastern Outboard Areas, most of the excavation was conducted to depths typically ranging from 5 to 10 feet with additional hot spot excavation/dredging to a maximum depth of 15 feet of Outboard Area materials where concentrations of

7 “Outboard”, as used herein, means the area outside the East and West barrier walls, as opposed to “inboard”, which means the area inside the barrier walls.

dichlorobenzenes and xylene exceeded the hot-spot criteria developed for the Onondaga Lake Bottom remedy. The cap was designed to isolate contamination in remaining sediments and soils.

Habitat restoration in the Outboard Area created emergent wetland areas and habitat that is suitable for northern pike reproduction. The restoration design included deeper pools for nursery habitat that coincide with the hot spot removal areas as a means of creating variable topography. As appropriate, additional fill materials were placed within the Outboard Area to achieve the final post-cap target grades.

A total of 229,500 cy of material was removed under the IRM. Approximately 64,000 cy of dry material was relocated to an area inboard of the barrier wall on Wastebed B consistent with the *Wastebed B Materials Management, Grading and Disposal Plan*. The remaining 165,500 cy was managed with the dredged Onondaga Lake sediments at the Sediment Consolidation Area at Wastebed 13.

Capping of soil/sediment/fill materials left in-place to isolate the remaining contamination, as part of the Onondaga Lake Bottom remedy, was completed in Fall 2016. Maintenance and monitoring of the Outboard Area IRM is included as part of Onondaga Lake monitoring.

- <u>Material Staging and Support Areas</u> – In addition to the materials managed under the *Wastebed B/Harbor Brook Materials Management, Grading, and Disposal Plan*, clean fill was placed to construct material staging and support areas in an 11.1-acre area on the western portion of Wastebed B and a 6-acre portion of the Penn-Can Property to support the Onondaga Lake dredging and capping efforts (see Figure 3).

In summary, IRMs have been implemented that address contaminated media at the Subsite. Specifically, Subsite DNAPL, and shallow and intermediate groundwater discharges to Onondaga Lake and Harbor Brook, are being addressed by barrier walls, a liner in Harbor Brook, and groundwater collection systems. These systems have been implemented to mitigate potential shallow and intermediate groundwater and DNAPL discharges to Onondaga Lake and Harbor Brook. Subsequent monitoring and observations have demonstrated that these potential discharges of shallow and intermediate groundwater and DNAPL have been mitigated and that IRM objectives related to discharges of groundwater and NAPL to Onondaga Lake have been met.

## HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS reports and a Proposed Plan proposing a preferred alternative were released to the public for comment on July 25, 2018. These documents were made available to the public via NYSDEC's website and at information repositories maintained at the Solvay Library, the Onondaga County Public Library, Atlantic States Legal Foundation, NYSDEC Region 7 office located in Syracuse, New York, and the NYSDEC Division of Environmental Remediation office located in Albany, New York. A NYSDEC listserv bulletin notifying the public of the availability for the above-referenced documents, the comment period start and completion dates, and the date of the planned public meeting was issued on July 25, 2018. A notice providing the same information was published in the *Syracuse Post-Standard* on July 26, 2018. The public comment period ran from July 25, 2018 to August 24, 2018. A NYSDEC listserv bulletin notifying the public of a 30-day extension to the public comment period was issued on August 23, 2018. A notice of the extension was published in *The Syracuse Post-Standard* on August 23, 2018. The public comment period was extended until September 24, 2018.

On August 16, 2018, NYSDEC conducted a public meeting at the Geddes Town Hall Courtroom, in Solvay, New York, to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for the Subsite, including the preferred remedy, to respond to questions, and accept comments. There were approximately 25 attendees. Responses to the questions and comments received at the public meeting and to comments submitted in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

## SCOPE AND ROLE OF OPERABLE UNIT

In addition to this Subsite, the following eleven other subsites are being addressed as part of the Onondaga Lake NPL site: Onondaga Lake Bottom; LCP Bridge Street; Geddes Brook/Ninemile Creek; Semet Residue Ponds; Willis Avenue; Wastebeds 1-8; General Motors (GM)-Inland Fisher Guide (IFG); Salina Landfill; Ley Creek PCB Dredgings; Lower Ley Creek; and Niagara-Mohawk Hiawatha Blvd.

Dredging and capping activities for the Onondaga Lake Bottom Subsite commenced in 2012. Dredging and capping activities in the Lake were completed in 2014 and 2016, respectively. Habitat restoration activities associated with that remedy were completed in 2017. The dredged material is being managed at a sediment consolidation area (SCA) constructed on a former Solvay wastebed, Wastebed 13. Construction activities at the SCA, which included the placement of an engineered cap, were completed in 2017. That subsite is undergoing long-term maintenance and monitoring.

Remedies have been fully implemented at the LCP Bridge Street, Geddes Brook/Ninemile Creek, Salina Landfill, and Ley Creek PCB Dredgings subsites. These subsites are undergoing long-term maintenance and monitoring. Remedial activities for portions of, or environmental media at, the Semet Residue Ponds, Wastebeds 1-8, GM-

IFG and Niagara-Mohawk subsites have been completed or are in progress. Other portions of, or media at, these subsites are in the remedial design or RI/FS phase. The Lower Ley Creek Subsite is in the remedial design phase. A RI/FS for the Willis Avenue Subsite is near completion.

The scope of the action for OU1 of the Wastebed B/Harbor Brook Subsite is to address the soil/fill material not addressed under the IRMs discussed above and to implement additional actions, where needed, in areas previously addressed under the IRMs. The scope of the action for OU1 of the Wastebed B/Harbor Brook Subsite also includes addressing shallow and intermediate groundwater. NYSDEC and EPA expect this remedy to be a final, comprehensive remedy for the soil/fill material, and for shallow and intermediate groundwater in this area.

Deep groundwater will be evaluated and addressed separately as part of a regional unit.

## SUMMARY OF SUBSITE CHARACTERISTICS

The RI activities that were conducted at the Wastebed B/Harbor Brook Subsite included geological and hydrogeological investigations, an ecological assessment, wetlands delineation, and the collection of samples from the shallow soil (top two feet of soil), subsurface soil (below two feet), groundwater, surface water, and sediment.

Based upon the results of the RI, the primary contaminants of concern (COCs) include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDD/Fs), and inorganics.

The results of the RI are summarized below.

### *Site Geology and Hydrogeology*

The geology at the Subsite consists of soil and fill material (including Solvay waste) overlying marl/peat, silt, clay, fine-grained sand/basal sand, gravel, till, and bedrock.

The Subsite has three distinct groundwater zones:

- A shallow zone within the soil/fill layer and underlying Solvay waste (where present);
- An intermediate zone within the marl/peat layer; and
- A deep zone that encompasses the silt and fine-grained sand deposits and the basal sand and gravel deposits (when present) located below the silt and clay confining unit.

The elevation of the shallow zone ranges from a minimum elevation of approximately 320 feet above mean sea level (amsl) along the lake shore to 395 feet amsl at the Penn-Can property. The maximum thickness of this unit is approximately 40 feet with an average thickness around 15 feet. The marl unit ranges from 320 feet amsl to 365 feet amsl. The maximum thickness of the marl is approximately 30 feet near the lake and the average thickness is about 15 feet. The deep sand and gravel ranges from 235 feet amsl to 335 feet amsl with the deep elevations being closer to Onondaga Lake. This zone has a maximum and average thickness of approximately 10 feet and 5 feet, respectively.

Shallow and intermediate groundwater generally flowed toward and discharged into Onondaga Lake and Harbor Brook prior to the installation of the East Barrier Wall, West Barrier Wall, and Upper Harbor Brook IRMs.

There is an upward vertical gradient on the Lakeshore Area from the deep groundwater to the intermediate groundwater and Onondaga Lake; however, because of the low hydraulic conductivity of the silt and clay confining layer above the deep groundwater zone, there is little deep groundwater movement vertically through this confining layer to the intermediate groundwater and Onondaga Lake. Deep groundwater contains a naturally-occurring halite brine.

To delineate the nature and extent of contamination, the analytical results from the RI sampling were compared to the respective SCOs provided in 6 NYCRR Part 375 *Environmental Remediation Programs* set forth for each land use type, including the Commercial Use SCOs (which includes passive recreational uses, such as walking trails), Industrial Use SCOs, and Unrestricted Use SCOs. The Unrestricted Use SCOs represent the concentration of a constituent in soil that, when achieved at a site, are sufficiently low so that New York State imposes no use restrictions on the site for the protection of public health, groundwater, and ecological resources. Additional information can be found in the RI report.

***Shallow Soil/Fill Materials (0- to 2-feet below ground surface [bgs])***

VOCs, SVOCs, pesticides, PCBs, PCDD/Fs, and inorganics were detected in shallow soil/fill material at the Subsite as described below. The data were compared to the Part 375 SCOs for Industrial, Commercial, and Unrestricted Uses. (See Table 1.)

<u>Lakeshore Area</u>

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the shallow soil/fill material at the Lakeshore Area. The COCs exceeding Part 375 Commercial Use SCOs primarily included benzo(a)pyrene (concentration range of 0.06 to 6.4 milligrams per kilogram [mg/kg]), benzo(b)fluoranthene (range of 0.071 to 9.5 mg/kg), benzo(a)anthracene (range of 0.05 to 6.9 mg/kg), 1,4-dichlorobenzene (range of 0.0095 to 350 mg/kg), dibenzo(a,h)anthracene (range of 0.072 to 1.4 mg/kg), PCBs (individual aroclors ranging from 0.02 to 6 mg/kg), barium (range of 32.5 to 1,240 mg/kg), cadmium (range of 0.055 to 121 mg/kg), copper (range of 13.4 to 744 mg/kg), and mercury (range of 0.09 to 64.3 mg/kg), while COCs exceeding the Part 375 Industrial Use SCOs were primarily attributable to benzo(a)pyrene, cadmium, and mercury. COCs exceeding the Part 375 Unrestricted Use SCOs included acetone, chlorinated benzenes, polycyclic aromatic hydrocarbons (PAHs), PCBs, and metals.

Penn-Can Property

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the shallow soil/fill material at the Penn-Can Property. The COCs exceeding the Part 375 Industrial and Commercial Use SCOs included arsenic (range of 2.5 to 34.4 mg/kg), mercury (range of 0.04 to 7.9 mg/kg), and the PAHs benzo(a)pyrene (range of 0.48 to 100 mg/kg), benzo(b)fluoranthene (range of 0.37 to 81 mg/kg) and benzo(a)anthracene (range of 0.44 to 6.9 mg/kg). For Part 375 Unrestricted Use SCOs, COC exceedances included arsenic, lead, mercury, and PAHs, as well as some PCBs and pesticides exceedances.

Railroad Area

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the shallow soil/fill material at the Railroad Area. The COC exceeding its Part 375 Commercial SCO is barium (range of 18.6 to 879 mg/kg), with no COCs exceeding Part 375 Industrial SCOs. The COCs exceeding the Part 375 Unrestricted Use SCOs included barium, lead, mercury, acetone, and PAHs.

AOS #1

VOCs, SVOCs, pesticides, PCBs, PCDD/Fs, and metals were detected in the shallow soil/fill material at AOS #1. The COCs exceeding the Part 375 Industrial and Commercial Use SCOs were mercury (range of 0.72 to 11.3 mg/kg), PAHs including benzo(a)pyrene (range of 2 to 32 mg/kg), benzo(b)fluoranthene (range of 1.9 to 27 mg/kg), and benzo(a)anthracene (range of 1.2 to 32 mg/kg), and PCBs (individual aroclors ranging from 0.2 to 4 mg/kg). For Part 375 Unrestricted Use SCOs, the COC exceedances included chlorinated benzenes, PAHs, PCBs, and various metals (including mercury).

AOS #2

VOCs, SVOCs, and metals were detected in the shallow soil/fill material at AOS #2. COCs exceeding the Part 375 Industrial and Commercial Use SCOs included the PAHs benzo(a)pyrene (range of 3.2 to 6.6 mg/kg), benzo(b)fluoranthene (range of 2.3 to 5 mg/kg), and benzo(a)anthracene (range of 3.3 to 5.8 mg/kg). Acetone, PAHs, lead, and mercury exceeded the Part 375 Unrestricted Use SCOs.

***Subsurface Soil/Fill Material (at depths greater than 2-feet bgs)***

VOCs, SVOCs, pesticides, PCBs, PCDD/Fs, and inorganics were detected in subsurface soil/fill material on the Subsite as described below. The analytical results were compared to the Part 375 SCOs for Commercial, Industrial, and Unrestricted Uses. (See Table 2.)

Lakeshore Area

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the subsurface soil/fill material at the Lakeshore Area. The COCs exceeding the Part 375 Commercial and Industrial Use SCOs include the following: benzene (range of 0.00006 to 190 mg/kg), total xylenes (range of 0.0007 to 860 mg/kg), PAHs including benzo(a)pyrene (range of 0.12 to 150 mg/kg), benzo(b)fluoranthene (range of 0.066 to 210 mg/kg), benzo(a)anthracene (range of 0.081 to 350 mg/kg), naphthalene (range of 0.067 to 21,000 mg/kg), arsenic (range of 0.42 to 55.4 mg/kg), barium (range of 9.9 to 1,700 mg/kg), PCBs (individual aroclors ranging from 0.035 to 6.59 mg/kg), and mercury (range of 0.03 to 97 mg/kg). The COCs exceeding the Part 375 Unrestricted Use SCOs included benzene, toluene, ethylbenzene, and xylene (collectively, BTEX), chlorinated benzenes, PAHs, phenolic compounds, pesticides, PCBs, and metals.

As described above, soils and sediments excavated during the various IRMs were placed on Wastebed B within the Lakeshore Area and managed under the *Wastebed B/Harbor Brook Materials Management, Grading, and Disposal Plan*. This data is now included as subsurface soil/fill material within the Subsite dataset. VOCs, SVOCs, pesticides, PCBs, PCDD/Fs, and metals were detected in the Wastebed B staged materials. The COCs exceeding the Part 375 Commercial and Industrial SCOs included PAHs, PCBs, arsenic, and mercury. For Part 375 Unrestricted SCOs, the COC exceedances included chlorinated benzenes, BTEX compounds, PAHs, phenolic compounds, and various metals, with some pesticide and PCB exceedances.

Penn-Can Property

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the subsurface soil/fill material at the Penn-Can Property. The COCs exceeding the Part 375 Industrial and Commercial Use SCOs included benzene (range of 0.0009 to 180 mg/kg), total xylenes (range of 0.003 to 990 mg/kg), PAHs including benzo(a)pyrene (range of 0.07 to 1,400 mg/kg), benzo(b)fluoranthene (range of 0.043 to 1,900 mg/kg), benzo(a)anthracene (range of 0.073 to 2,000 mg/kg), naphthalene (range of 0.045 to 14,000 mg/kg), arsenic (range of 0.76 to 103 mg/kg), and mercury (range of 0.006 to 5.9 mg/kg). The COCs exceeding the Part 375 Unrestricted Use SCOs were BTEX compounds, PAHs, various metals, and included some pesticides and PCBs.

Railroad Area

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the subsurface soil/fill material at the Railroad Area. COCs exceeding the Part 375 Industrial and Commercial Use SCOs included benzo(a)anthracene (range of 0.16 to 8.2 mg/kg), benzo(a)pyrene (range of 0.17 to 3.7 mg/kg), and arsenic (range of 0.8 to 22.7 mg/kg). The COCs exceeding the Part 375 Unrestricted Use SCOs included BTEX compounds, PAHs, three pesticides, and various metals.

AOS #1

VOCs, SVOCs, PCBs, and metals were detected in the subsurface soil/fill material at AOS #1. The COCs exceeding the Part 375 Industrial and Commercial Use SCOs included mercury (range of 0.02 to 6.2 mg/kg), PAHs including benzo(a)pyrene (range of 0.13 to 56 mg/kg), benzo(b)fluoranthene (range of 0.091 to 35 mg/kg), benzo(a)anthracene (range of 0.085 to 63 mg/kg), and naphthalene (range of 0.48 to 570 mg/kg). The COCs exceeding the Part 375 Unrestricted Use SCOs included PAHs and various metals (including mercury), BTEX compounds, PCBs, and chlorinated benzenes.

AOS #2

VOCs, SVOCs, pesticide (4,4-DDE), and metals were detected in the subsurface soil/fill material at AOS #2. However, only acetone exceeded its Part 375 Unrestricted Use SCO, and there were no exceedances of the Part 375 Commercial or Industrial Use SCOs.

**Shallow and Intermediate Groundwater**

Shallow and intermediate groundwater discharges to Onondaga Lake, Harbor Brook, East Flume, and drainage ditches located on the Subsite have been addressed by the barrier walls and/or groundwater collection systems installed as part of the West Wall IRM, East Wall IRM, and Upper Harbor Brook IRM. Prior to the IRMs, groundwater quality was evaluated for the Subsite during the Preliminary Site Assessment (PSA), RI, Supplemental RI, and IRM-related investigations in the shallow and intermediate groundwater zones. The analytical data were compared to the New York State Class GA groundwater standards and guidance values (SGVs). (See Table 3.)

Deep groundwater at the Subsite will be further evaluated and addressed separately as part of a subsequent operable unit addressing a regional unit along with other nearby subsites (*i.e.,* Wastebeds 1-8, Willis Avenue, and Semet Residue Ponds).

<u>Lakeshore Area</u>

VOCs, SVOCs, and inorganics were detected in Lakeshore Area shallow and intermediate groundwater. The COCs exceeding the Class GA SGVs for shallow and intermediate groundwater included:

- VOCs: benzene (range of 0.3 to 3,900 micrograms per liter [µg/L]), toluene (range of 0.17 to 5,740 µg/L), ethylbenzene (range of 0.7 to 350 µg/L), total xylenes (range of 0.29 to 3,500 µg/L), chlorinated benzenes including 1,2-dichlorobenzene (range of 0.19 to 7,560 µg/L) and 1,4-dichlorobenzene (range of 0.11 to 8,700 µg/L), acetone (range of 3 to 460 µg/L), and styrene (range of 0.3 to 850 µg/L);
- SVOCs: PAHs including naphthalene (naphthalene range of 1.5 to 35,000 µg/L), and phenolic compounds including phenol (phenol range of 1.4 to 18,000 µg/L) and 2-methylphenol (range of 1.2 to 8,000 µg/L);
- Inorganics: sodium (range of 62 to 42,500 milligrams per liter [mg/L]), iron (range of 0.03 to 29 mg/L), chloride (range of 130 to 64,000 mg/L), mercury (range of 0.00005 to 0.03 mg/L), and magnesium (range of 0.06 to 513 mg/L).

Elevated VOC and SVOC concentrations (especially BTEX compounds, PAHs, and phenolic compounds) in the shallow groundwater were observed in the eastern portion of the Lakeshore Area, downgradient of the Penn-Can Property, and in the western portion along the former East Flume and in DSA #2. These are related to either the previous activities at the Penn-Can Property, Willis Avenue, and/or dredge spoils from the former East Flume and Onondaga Lake (western portion). The elevated concentrations of mercury in shallow groundwater occurred along the former East Flume. The other inorganic compounds (*i.e.*, sodium, iron, magnesium, etc.) are either related to Solvay waste and/or the native halite brine.

For the intermediate groundwater, BTEX compounds, PAHs, and phenolic compounds were highest downgradient of the Penn-Can Property, while chlorinated benzenes were highest near the former East Flume. Inorganic compounds were variable over the entire area. The containment of shallow and intermediate groundwater is being achieved by the East and West Barrier Wall and Upper Harbor Brook groundwater collection systems.

<u>Penn-Can Property</u>

The COCs detected and exceeding the Class GA SGVs for shallow and intermediate groundwater include:

- VOCs: benzene (range of 1.7 to 1,100 µg/L), toluene (range of 1 to 2,400 µg/L), ethylbenzene (range of 2.4 to 540 μg/L), total xylenes (range of 2 to 4,800 μg/L);

- SVOCs: PAHs including naphthalene (range of 9.5 to 13,000 μg/L) and phenolic compounds including phenol (range of 2 to 250 μg/L) and 2-methylphenol (range of 31 to 230 μg/L);
- Inorganics: sodium (range of 16 to 140 mg/L), iron (range of 0.06 to 9.8 mg/L), manganese (range of 0.006 to 0.36 mg/L), chromium (range of 0.004 to 0.07 mg/L), and lead (range of 0.007 to 0.04 mg/L).

Elevated VOC and SVOC concentrations (especially BTEX compounds, PAHs, and phenolic compounds) in the shallow and intermediate groundwater were observed in the eastern half of the Penn-Can Property, with the highest concentrations observed in the intermediate groundwater.

These are related to the previous historic operations associated with the property. The containment of shallow and intermediate groundwater is being achieved by the barrier walls and/or groundwater collection systems installed as part of the West Wall IRM, East Wall IRM, and Upper Harbor Brook IRM.

Railroad Area

The COCs detected and exceeding the Class GA SGVs for shallow and intermediate groundwater included:

- VOCs: benzene (range of 2.15 to 585 μg/L), toluene (range of 0.2 to 590 μg/L), ethylbenzene (range of 160 to 210 μg/L), total xylenes (range of 0.2 to 1,500 μg/L) and styrene (range of 300 to 400 μg/L)
- SVOCs: bis(2-ethylhexyl)phthalate (BEHP, range of 1.2 to 110 μg/L), naphthalene (range of 1 to 12,000 μg/L) and phenolic compounds including phenol (range of 52 to 74 μg/L) and 2-methylphenol (range of 39 to 59 μg/L)
- Inorganics: sodium (range of 13.2 to 2,280 mg/L), iron (range of 0.03 to 15 mg/L), chloride (range of 8.6 to 3,770 mg/L), and magnesium (range of 1.48 to 167 mg/L).

Few VOC and SVOC COCs exceeded their Class GA SGVs in the shallow groundwater, but the intermediate groundwater in the eastern end had VOC and SVOC concentrations and exceedances that were similar to the intermediate groundwater on the Penn-Can Property. These COCs are likely related to previous activities at the Penn-Can Property. The containment of shallow and intermediate groundwater is being achieved by the groundwater collection systems installed as part of the West Wall IRM, East Wall IRM, and Upper Harbor Brook IRM.

AOS #1

The COCs detected and exceeding the Class GA SGVs for shallow and intermediate groundwater included:

- VOCs: benzene (range of 0.35 to 2.1 μg/L) and toluene (range of 0.2 to 17.6 μg/L)
- SVOCs: phenolic compounds including phenol (range of 1.4 to 230 μg/L) and 2-methylphenol (range of 1.8 to 4.2 μg/L); and naphthalene (range of 1.1 to 38 μg/L)
- Inorganics: sodium (range of 910 to 26,650 mg/L), iron (range of 0.17 to 43 mg/L), chloride (range of 1,800 to 43,600 mg/L), manganese (range of 0.11 to 5.11 mg/L), and barium (range of 0.19 to 2.3 mg/L).

Elevated COC concentrations and exceedances were observed in the Outboard Area and inboard of the barrier wall, with variable distribution. These concentrations are likely related to impacted sediment deposition from historical former East Flume discharges and Harbor Brook discharges.

The containment of shallow and intermediate groundwater from AOS #1 is being addressed by the groundwater collection systems installed as part of the East Wall IRM and Upper Harbor Brook IRM, and the capping system installed as part of the Outboard Area IRM/Onondaga Lake Bottom remediation.

<u>AOS #2</u>

Intermediate groundwater at AOS #2 had similar COCs exceeding the Class GA SGVs as the eastern corner of the Railroad Area. These included benzene (range of 850 to 960 μg/L), toluene (range of 11.6 to 22 μg/L), ethylbenzene (range of 240 to 300 μg/L), total xylenes (detection of 92.7 μg/L), naphthalene (range of 1,100 to 2,200 μg/L), and inorganics such as chloride (range of 3,910 to 4,700 mg/L), iron (range of 1.8 to 12.5 mg/L), manganese (range of 0.31 to 0.55 mg/L), and sodium (range of 2,360 to 3,000 mg/L). The organics are likely related to previous activities at the Penn-Can Property, while the inorganics are likely related to Solvay waste and/or native brine.

The containment of shallow and intermediate groundwater from AOS #2 is being addressed by the Upper Harbor Brook IRM collection system.

### Surface Water

Recent surface water data demonstrate that surface water impacts have been addressed by the Upper Harbor Brook IRM, as documented in the Upper Harbor Brook IRM annual reports. Prior to the IRM, surface water quality was evaluated for the Subsite during the PSA, RI, Supplemental RI, and IRM-related investigations for the on-Subsite drainage ditches, East Flume, and Harbor Brook. These analytical data were compared to the New York State Class C surface water SGVs, except for the East Flume. Surface water impacts to Onondaga Lake from Harbor Brook and the East Flume, as well as the on-Subsite drainage ditches, have been addressed by IRMs (discussed above). Surface water samples in Harbor Brook and on-Subsite drainage ditches have been collected annually as part of the Performance Verification program since 2014. A limited number of constituents have been detected above criteria, however, the results indicate that their presence is most likely attributable to influences from upstream and off-Subsite sources.

<u>Lakeshore Area - I-690 Drainage Ditch</u>

Prior to the IRMs, VOCs, SVOCs, a pesticide, and inorganics were detected in the Lakeshore Area I-690 Drainage Ditch surface water. Elevated COC concentrations and Class C SGV exceedances were observed in the I-690 Drainage Ditch surface water including benzene (range of 9.6 to 130 µg/L), toluene (range of 28 to 270 µg/L), ethylbenzene (range of 2.9 to 21 µg/L), total xylenes (range of 77 to 300 µg/L), naphthalene (range of 160 to 1,400 µg/L), and phenol (range of 17 to 700 µg/L).

<u>Penn-Can Property</u>

Prior to the IRMs, VOCs, SVOCs, and inorganics were detected in the Penn-Can Property Drainage Ditch surface water. In the drainage ditch adjacent to the railroad tracks on the Penn-Can Property, COCs that exceeded the Class C SGVs included naphthalene (range of 12 to 350 µg/L), iron (range of 0.08 to 11.4 mg/L), cyanide (range of 0.01 to 0.03 mg/L), and aluminum (range of 0.11 to 1.33 mg/L).

<u>Railroad Area</u>

Prior to the IRMs, VOCs, SVOCs, and inorganics were detected in the Railroad Area Drainage Ditches surface water. In the two drainage ditches on the Railroad Area, there were few SVOC COCs that exceeded the Class C SGVs including one exceedance each for benzo(a)anthracene (1.6 µg/L), benzo(a)pyrene (2 µg/L), and BEHP (5.2 µg/L). Inorganic COCs that exceeded the SGVs included iron (range of 0.16 to 3.7 mg/L) and aluminum (range of 0.11 to 2.13 mg/L).

<u>Harbor Brook</u>

Prior to the IRMs, VOCs, SVOCs, and inorganics were detected in the Harbor Brook surface water. The COC exceedances observed in the Harbor Brook surface water included naphthalene (range of 5.2 to 2,200 µg/L), aluminum (range of 0.02 to 1.69 mg/L) and iron (range of 0.08 to 12.3 mg/L). These were likely because of the Harbor Brook sediment, on-Subsite drainage ditches discharging into the brook, groundwater interaction with Harbor Brook, and upstream inputs.

### Sediment

Sediments in waterbodies that discharge to Onondaga Lake (*i.e.,* Harbor Brook and East

Flume), as well as the on-Subsite drainage ditches and wetland areas, have been addressed by IRMs. The IRMs addressed the sediments by removal and placement of cover material and/or an isolation layer.

**DNAPL and Stained Soils**

DNAPL and stained soils were encountered in soil borings and test pits advanced during the investigations and IRM work performed at the Subsite. In general, there are six areas of DNAPL, DNAPL-stained soils, or other visibly-contaminated materials that were encountered on the Subsite. Potential migration of the DNAPL has been addressed by IRMs. Some of these materials may exhibit characteristics of principal threat waste. These six areas are discussed briefly below and in depth in the RI and FS Reports. A detailed explanation of principal threat waste can be found in the “Principal Threat Waste” section.

<u>Coal tar-like DNAPL associated with the Penn-Can Property</u>

The coal tar-like DNAPL is found primarily on the Penn-Can Property and downgradient at Wastebed B. To a lesser extent, it is found on the Railroad Area, AOS #2, beneath Harbor Brook, and in the western portion of AOS #1. This DNAPL has a naphthalene chemical signature, and its physical characteristics and chemistry are provided in the RI Report. The coal tar-like DNAPL likely originated from the former Barrett Paving facility operations/infrastructure, such as tanks, process lines, ditches, and waste tile drains.

The approximate extent of DNAPL found in the fill and marl is presented in the RI Report. Cross sections were developed to evaluate the extent of DNAPL, DNAPL-stained material, and the subsurface lithology as depicted in the RI Report. The coal tar-like DNAPL was also observed in the deep unit on the Penn-Can Property where this unit is closer to the surface and not overlain by the silt and clay confining layer. The DNAPL in the deep unit occurs in the coarse sand above the till/bedrock unit in several locations. The interpreted extent of this DNAPL in the deep unit is presented in the RI Report.

The depositional structure of the marl unit and the initial driving DNAPL head on the Penn-Can Property are the most likely factors affecting the DNAPL migration.

<u>Surficial tar associated with the Penn-Can Property</u>

Since the development of the RI Report, localized areas of tar materials were observed at the surface on the Penn-Can Property. It is believed that the migration of the tar occurred because of ground vibrations associated with truck traffic in the area during implementation of the Onondaga Lake remedy. During this time, approximately 300 large trucks containing imported clean topsoil and other materials traversed the area on a daily basis. These tar materials are potentially related to tank bottoms that were disposed at the Subsite and will be investigated further and addressed by the selected remedy as discussed below.

Stained soils associated with AOS #1 and Wetland Area WL2

Black-stained material was found in the shallow fill material in the Lakeshore Area in wetland area WL2 and at AOS #1 (see Figure 3). The approximate extent of the stained soils is presented in the RI Report. The staining in the shallow fill in these areas is often tar-like in appearance and is composed of PAHs. The stained fill material is incorporated in the fill and occurs above the marl, which suggests that the stained material has a different origin than the coal tar-like DNAPL.

Based on review of historical aerial photography and Subsite borings, it appears that fill may also have been deposited in these low-lying areas sometime between 1959 and 1967. The nature of fill materials that may have been placed in this area is unknown. This black tar-like material causing the staining appears to be adsorbed to and entrained in the fill.

These stained materials were predominantly located within the Outboard Area and were either excavated or capped and covered under the Outboard Area IRM. Some of these materials were also addressed during the installation of the West Wall IRM and East Wall IRM barrier walls and groundwater collection systems. Stained shallow fill material inboard of the barrier wall is evaluated in this ROD.

Chlorobenzene DNAPL in soil boring HB-SB-01 at 34 to 36 feet bgs

The chlorobenzene DNAPL is related to operations at the former Willis Avenue plant. This DNAPL has been addressed by the Willis/Semet IRM Barrier Wall and the West Wall portion of the Wastebed B/Harbor Brook IRM.

Black-stained organic material associated with the DSAs

Black stained organic material was encountered in the shallow fill along the Upper and Lower (former) East Flume in DSA #1 and DSA #2. The origin of this material is believed to be dredge material from the former East Flume and Onondaga Lake that was generated during the installation of the diffuser building intake pipe in 1977. This material is similar in chemical characteristics to the stained material in AOS #1 and the wetland areas near the mouth of Harbor Brook except that chlorobenzenes tend to be more prevalent.

DSA #1 is located under the area formerly used to support the Onondaga Lake dredging and capping project (Onondaga Lake Bottom remedy support area). DSA #2 is predominantly in the Outboard Area with most materials excavated or already addressed under the Outboard Area IRM, while the remaining DSA #2 material was removed as part of West Wall IRM or is addressed in this ROD.

Tar-like material in Test Pit HB-TP-18

Tar-like material observed in test pit HB-TP-18 appeared to be isolated to this location. The source of this material is unknown but is likely related to historic operations at the Barrett Paving facility, or undigested sewage sludge placed on the eastern portion of Wastebed B during the 1950s and early 1960s, or was co-disposed with the Solvay waste during the operation of Wastebed B. Test pit HB-TP-18 is located below the 12-acre area on Wastebed B where staged materials were previously placed (see Figure 3).

**Conclusions**

Based on the RI, the following conclusions have been drawn:

- COCs identified for the Subsite include BTEX, chlorinated benzenes, naphthalene and PAHs, phenolic compounds, PCBs, PCDD/PCDFs, and inorganics;
- DNAPL, tar materials, and stained soils are present in several areas of the Subsite. As noted above, these materials may exhibit characteristics of principal threat waste.

**Waste Management Area**

The NCP preamble language sets forth the EPA's policy that, for groundwater, "remediation levels generally should be attained throughout the contaminant plume, or at and beyond the edge of the waste management area when waste is left in place." The NCP preamble also indicates that, in certain situations, it may be appropriate to address the contamination as one waste management area (WMA) for purposes of the groundwater point-of-compliance (POC). The groundwater POC for meeting applicable or relevant and appropriate requirements (ARARs) is established at the WMA boundary. As a result of the presence of historical fill materials deposited at the Subsite and the adjacent in-lake-waste-deposit (ILWD) located within Onondaga Lake, it has been determined that the area is a waste management area (WMA) (see Figure 5) with the groundwater restoration point of compliance being the WMA unit boundary. The material within the WMA includes Solvay waste commingled with hazardous substances that are contaminants of concern at the Site. The management of the waste within the WMA includes meeting Resource Conservation and Recovery Act (RCRA) municipal landfill capping requirements. In many areas, existing covers and/or soil/fill material is expected to meet the $1 \times 10^{-5}$ centimeters per second (cm/sec) permeability rate required under the Subtitle D requirements. Buildings/asphalt parking lots are expected to achieve and exceed these infiltration requirements. In areas where existing covers or soil/fill material do not meet the permeability requirement, cover material will include materials needed to achieve the required infiltration rate requirements. The WMA boundary is conceptual and may be refined during remedial design.

### Contamination Fate and Transport

Natural attenuation is a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include the following: biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants. As a remedial strategy, these conditions are monitored to ensure that natural attenuation is working. The monitoring of natural attenuation is called monitored natural attenuation (MNA).

Once site characterization data have been collected and a conceptual site model (CSM)[8] has been developed, the efficacy of MNA as a remedial strategy is evaluated. For the Subsite, site-specific data was used to estimate the rate of attenuation processes and the anticipated time required to achieve the remedial action objectives. A three-tiered evaluation was utilized consistent with OSWER Directive 9200.4-17P. The three “lines of evidence” are historical groundwater and/or soil chemistry data that demonstrate a clear and meaningful trend of decreasing contaminant mass and/or concentration over time at appropriate monitoring or sampling points, hydrogeologic and geochemical data that can be used to demonstrate indirectly the type(s) of natural attenuation processes active at the site, the rate at which such processes will reduce contaminant concentrations to required levels, and data from field or microcosm studies which directly demonstrate the occurrence of a particular natural attenuation process at the site and its ability to degrade the contaminants of concern.

Based on the results of a 2017 field investigation to assess degradation in groundwater, it has been concluded that degradation of organic constituents is occurring in shallow and intermediate groundwater at and beyond the POC. (See FS Report, Appendix C.) The multiple lines-of-evidence for the Subsite are summarized below.

O’Brien and Gere Engineers, Inc. evaluated shallow and intermediate groundwater data collected in 2017 (see Feasibility Study Report, Wastebed B/Harbor Brook Site, Appendix C, Shallow and Intermediate Groundwater Natural Attenuation Evaluation, O’Brien and Gere Engineers, Inc. July 2018). This evaluation included geochemical and

[8] A CSM illustrates contaminant sources, release mechanisms, exposure pathways, migration routes, and potential human and ecological receptors. The CSM is presented on RI Figures115 and 116.

analytical data, Compound Specific Isotope Analysis (CSIA) data, and calculated fractions degraded and half-life ranges, and calculated times to achieve Class GA standards, as well as an additional line of evidence that included concentration trend plots and regression analysis. These lines of evidence yielded the following conclusions:

- The geochemical and dissolved gases data for the shallow and intermediate groundwater are consistent with anaerobic and reducing conditions and potentially include sulfate-reducing, iron-reducing, and/or methane-reducing conditions.
- The statistical evaluation (Mann-Kendall test and regression analysis) of the trend plots showed multiple constituents and site-constituent pairs with statistically significant downward trends of concentrations over time.
- CSIA scatterplots and flow path evaluation demonstrate unequivocal evidence of degradation that follows the clear pattern of less degraded material found upgradient near source areas and more degraded material downgradient.
- The lake bottom cap (including chemical isolation layer and amendment additions) was designed to be effective for at least 1,000 years, which is greater than the time needed to achieve the NYSDEC Class GA standards for benzene, toluene, and chlorobenzene.
- The hydraulic containment systems along the Onondaga Lake shoreline collect the shallow and intermediate groundwater for treatment prior to reaching the lake and provide a protective measure for future inputs from the inboard sites.
- The area outboard of the barrier wall and/or hydraulic containment systems was dredged, and much of the area was capped with clean fill during the lake remedy (including a ≥ 1,000-year cap), and shallow and intermediate groundwater have an upwelling velocity of less than 2 centimeters/year.

Based on the multiple lines of evidence, degradation of groundwater organic constituents is occurring in the shallow and intermediate groundwater, and lake protectiveness is being achieved via natural attenuation and degradation (*e.g.*, biodegradation).

The time needed to achieve the respective Class GA standards has been conservatively estimated. The table below presents a summary of the results. Estimates range from approximately zero years to approximately 700 years, with all results less than the 1,000-year cap design.

| Outboard Area Years to Class GA Standard | |
|---|---|
| Using Porewater Median Concentration | |
| Benzene | 100-200 Years |
| Toluene | Zero<br>Toluene porewater median concentration is below the respective Class GA standard. |
| Chlorobenzene | 100-200 Years |
| Using Porewater 90% Upper Confidence Limit of the Mean Concentration | |
| Benzene | 200-400 Years |
| Toluene | 40-50 Years |
| Chlorobenzene | 400-700 Years |

Similar to benzene, toluene, and chlorobenzene, other site-related compounds (i.e., phenolic compounds, naphthalene, and other PAHs) are likely to degrade in the outboard shallow and intermediate groundwater. These organic compounds can be degraded under aerobic and anaerobic conditions, and the degradation rate will vary between the locations along the shoreline, depending on the location-specific conditions present.

Further evaluation of MNA will need to be conducted as part of the preliminary remedial design and/or operation and maintenance (O&M).

It should also be noted that active measures to address groundwater were not considered beyond the FS screening evaluation because of low permeability conditions, the potential for injection well fouling, and variability of geochemical conditions. The ability to implement active measures would also be limited within Onondaga Lake. As an example, groundwater upwelling velocity was a key variable in the design of the Lake Bottom cap. Implementing active measures such as in-situ treatment or pumping groundwater using vertical or horizontal extraction wells installed under the Lake may mobilize groundwater and produce conditions different than those used for the Lake Bottom cap modeling and design. Given this, it is not anticipated that a contingency remedy could or should be implemented even if MNA was determined not to be progressing as anticipated because doing so could potentially compromise the effectiveness of the Lake Bottom cap.

## CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

***Land Use***

The Subsite areas are currently zoned for various uses by the Town of Geddes and City of Syracuse. The Wastebed B/Harbor Brook Subsite areas, including the Penn-Can Property, Railroad Area, and AOS #2, are currently zoned for industrial use. The Lakeshore Area and AOS#1 (45-acres) is zoned as parkland. Based on the land use evaluation, the reasonably anticipated use of the Lakeshore Property (north of I-690) is for construction of paved roads and trails for passive recreational use as part of the Onondaga County West Shore Trail Extension and future access/use of the Southwest Lakeshore Area (an area along Onondaga Lake currently being enhanced for public use). It is reasonably anticipated that the portions of the property south of I-690 (Penn-Can Property, Railroad Area) will continue to be used for industrial or commercial purposes and/or may be used for parking for the State Fairgrounds.

## SUMMARY OF SUBSITE RISKS

As part of the RI process, baseline quantitative risk assessments were conducted for the Subsite to estimate the risks to human health (under current and anticipated future land uses) and the environment. Baseline risk assessments, consisting of a baseline human health risk assessment (BHHRA), which evaluates potential risks to people, and a baseline ecological risk assessment (BERA), which evaluates potential risks to the environment, analyze the potential for adverse effects caused by hazardous substance releases from a site assuming no further actions to control or mitigate exposure to these hazardous substances are taken. The risk assessments for this Subsite (see associated BHHRA and BERA reports discussed below) are available in the information repositories discussed above in Highlights of Community Participation.

### *Human Health Risk Assessment*

A BHHRA was conducted to estimate current and future effects of contaminants on human health. A BHHRA is an analysis of the potential adverse human health effects caused by hazardous substance exposure in the absence of any actions to control or mitigate these exposures under current and future site uses. It provides the basis for taking an action and identifies the contaminants and exposure pathways that need to be addressed through implementation of the remedial action. This section of the ROD summarizes the results of the BHHRA for the subsite.

The BHHRA, entitled *Human Health Risk Assessment, Wastebed B/Harbor Brook Site,* dated October 2009, is available in the Administrative Record file and site repositories for this Subsite.

A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios, as follows:

***Hazard Identification*** – uses the analytical data collected to identify the contaminants of potential concern (COPCs) for each medium, with consideration of a number of factors explained below.

***Exposure Assessment*** – estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (*e.g.*, ingesting contaminated soil) by which humans are potentially exposed.

***Toxicity Assessment***- determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of effect (response).

***Risk Characterization*** – summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations that exceed acceptable levels, defined by the NCP as an excess lifetime cancer risk greater than 1 x $10^{-6}$ to 1 x $10^{-4}$ or a Hazard Index greater than 1.0; contaminants at these concentrations are considered COCs and are typically those that will require remediation at a site. Also included in this section is a discussion of the uncertainties associated with these risks.

**Hazard Identification**

In this step, analytical data collected during the RI is used to identify COPCs in the surface and subsurface soil, surface and subsurface sediment, surface water, groundwater, indoor and outdoor air, and fish tissue at a site based on factors such as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations of the contaminants, as well as their mobility and persistence.

**Exposure Assessment**

In this step, the different exposure scenarios and pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Consistent with Superfund policy and guidance, the BHHRA is a baseline human health risk assessment and therefore assumes no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at a site. The RME is defined as the highest exposure that is reasonably expected to occur at a site.

The exposure assessment identified potential human receptors based on a review of current and reasonably foreseeable future land use at the Subsite. As described previously, there are several distinct areas of the Subsite that were investigated. Exposure scenarios were developed taking into account how receptors currently and potentially in the future might access these areas through reasonable activities. Based on these considerations, the following exposure units were developed:

| Exposure Unit | Areas Included |
|---|---|
| Exposure Unit 1 | Site-Wide |
| Exposure Unit 2 | Harbor Brook, Lakeshore Area, East Flume, DSA #1, DSA #2 |
| Exposure Unit 3 | Interstate 690 Drainage Ditch |
| Exposure Unit 4 | Railroad Area |
| Exposure Unit 5 | Penn-Can Property |
| Exposure Unit 6 | Harbor Brook, Lakeshore Area, East Flume, DSA #1, DSA #2, and AOS #1 |
| Exposure Unit 7 | Penn-Can Property, Lakeshore Area, DSA #1, DSA #2, AOS #1, and AOS #2 |
| Exposure Unit 8 | Site-Wide Groundwater |

Receptors evaluated in the HHRA include the older child and adult trespasser, utility worker, construction worker, surveillance worker, ditch worker, railroad worker, commercial/industrial worker, adult and child recreational visitor, and adult and child resident. Exposure to fish tissue, surface and subsurface sediment, surface and subsurface soil, surface water, potable groundwater, and indoor air and outdoor air was evaluated. The specific exposure scenarios are presented in Tables 4.1-4.8.

**Toxicity Assessment**

In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects were determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and noncancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards because of exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the human health risk assessment were taken from the Integrated Risk Information System database, the Provisional Peer Reviewed Toxicity Database, or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. Non-cancer toxicity information can be found in Tables 5.1 and 5.2, while cancer toxicity information can be found in Tables 6.1 and 6.2.

## Risk Characterization

This step summarized and combined outputs of the exposure and toxicity assessments to provide a quantitative assessment of Subsite risks. Exposures were evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF
Where: Risk = a unitless probability ($1 \times 10^{-6}$) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

The likelihood of an individual developing cancer is expressed as a probability that is usually expressed in scientific notation (such as $1 \times 10^{-4}$). For example, a $1 \times 10^{-4}$ cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions described in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of $10^{-4}$ to $10^{-6}$ (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk). For noncancer health effects, a hazard index (HI) is calculated. The HI is determined based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as shown below.

HQ = Intake/RfD
Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (*i.e.*, chronic, subchronic, or acute).

The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

The key concept for a noncancer HI is that a "threshold level" (measured as an HI of less than 1.0) exists below which noncancer health effects are not expected to occur. The HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The cancer risks and noncancer hazard were estimated for each of the Exposure Units, and risk for the specific populations identified in each unit under current and reasonably anticipated future use was evaluated. Cancer risks and noncancer hazards above EPA's acceptable levels were identified in Exposure Units 1 (Site-wide), 5 (Penn-Can Property), 6 (Harbor Brook, Lakeshore Area, East Flume, DSA #1, DSA #2, AOS #1), 7 (Penn-Can Property, Lakeshore Area, DSA #1, DSA #2, AOS #1 and AOS #2) and 8 (Site-wide groundwater), with chemicals such as dioxins, highly chlorinated PCBs, less chlorinated PCBs, PAHs, and mercury among the contaminants associated with unacceptable levels of risk. A complete summary of all chemicals with cancer risk and noncancer hazards above acceptable levels can be found in Tables 7.1-7.13.

**Uncertainty in the Risk Assessment**

The process of evaluating human health cancer risks and noncancer health hazards involves multiple steps. Inherent in each step of the process are uncertainties that ultimately affect the final risks and hazards. Important site-specific sources of uncertainty are identified for each of the steps in the four-step risk process below.

**Uncertainties in Hazard Identification**

Uncertainty is always involved in the estimation of chemical concentrations. Errors in the analytical data may stem from errors inherent in sampling and/or laboratory procedures. While the datasets for this subsite are robust, since environmental samples are variable the potential exists that these datasets might not accurately represent reasonable maximum concentrations. There is a low potential that the risks may be overestimated or underestimated.

### Uncertainties in Exposure Assessment

There are two major areas of uncertainty associated with exposure parameter estimation. The first relates to the estimation of EPCs. The second relates to parameter values used to estimate chemical intake (e.g., ingestion rate, exposure frequency). The estimates of the EPCs are influenced on how likely the dataset fully characterizes the contamination at the site. These datasets are robust, so the potential for overestimating or underestimating risk is low. Many of the exposure parameters used in the HHRA are based on best professional judgement. There is a low potential that the risks may be overestimated or underestimated.

### Uncertainties in Toxicity Assessment

A potentially large source of uncertainty is inherent in the derivation of the EPA toxicity criteria (i.e., RfDs, RfCs, SFs). Although these toxicity criteria have been extensively reviewed and peer-reviewed, there is a medium potential that uncertainty factors applied during their derivation may result in overestimation or underestimation of risk. Additionally, there are many contaminants for which no toxicity values are available and therefore they are not quantitatively evaluated in the HHRA. There is high potential for underestimation because of this lack of toxicity information.

### Uncertainties in Risk Characterization

When all of the uncertainties from each of the previous three steps are added, uncertainties are compounded. Since it is unknown whether many of the uncertainties result in an overestimation or underestimation of risk, the overall impact of these uncertainties is unquantifiable. However, some of the uncertainties, such as the lack of toxicity information, will likely result in an overall underestimation of risk.

### *Ecological Risk Assessment*

The Subsite BERA identified current and future habitat use and potential ecological receptors at the Subsite. Based on the ecological receptors identified, unacceptable risk was posed by the following COCs by receptor for each Exposure Area:

**Main Subsite Exposure Area**, including the Lakeshore Area, Penn-Can Property, Railroad Area, delineated wetlands not contiguous with Onondaga Lake, AOS #1, and AOS #2:

- Potential risk to terrestrial plants is posed by metals (primarily chromium, mercury, and silver) via exposure to surface soils.

- Potential risk to soil invertebrates is posed by chromium via eco exposure to surface soils.
- Potential risk to aquatic organisms is posed by six inorganics, total PCBs, one pesticide, four SVOCs, and nine VOCs based upon a comparison of groundwater data to surface water values protective of aquatic organisms.
- Potential risk to fish is posed by seven inorganics, total PCBs, two pesticides, twelve SVOCs, and thirteen VOCs based upon a comparison of groundwater data to surface water values protective of the fish community.
- Potential risk to upper trophic level receptors, insectivorous birds and mammals, and carnivorous birds and mammals is determined via food chain exposure.

    - Risk to insectivorous birds is primarily associated with barium, chromium, mercury, methyl mercury, BEHP, hexachlorobenzene, pyrene and dioxins;[9]
    - Risk to insectivorous mammals is primarily associated with cadmium, methylmercury and hexachlorobenzene;
    - Risk to carnivorous mammals is primarily associated with chromium and the mammalian dioxin equivalent; and
    - Risk to carnivorous birds is primarily associated with the avian dioxin equivalent.

As discussed in the FS Report (also see Figure 4), the IRM activities associated with the West Wall IRM, East Wall IRM, Upper Harbor Brook IRM, and Outboard Area IRM, as well as the *Wastebed B/Harbor Brook Material Management, Grading, and Disposal Plan*, have mitigated risks posed to ecological receptors associated with exposure to select areas of surface soil.

**Aquatic Exposure Area**, including the former East Flume, Harbor Brook, and Subsite drainage ditches:

- Aquatic organisms in the East Flume had no risk associated with exposure to surface water. In the Harbor Brook/Subsite ditches area, six metals, four SVOCs, and three VOCs posed unacceptable risk related to exposure to surface water;
- Potential risk to benthic invertebrates in Harbor Brook/Subsite ditches via exposure to sediment was identified, but not attributed to any particular constituent or category of constituents, as there were exceedances of screening criteria in all categories of constituents, while potential risk to East Flume benthic invertebrates via exposure to sediment was presented by PAHs;
- Potential risk to fish in Harbor Brook/Subsite ditches is primarily associated with dissolved levels of pesticides and SVOCs (mostly PAHs) in surface water and

[9] Dioxins refer to a group of compounds that include 2,3,7,8-tetrachlorodibenzo-para-dioxin, as well as other dioxin-like compounds that have similar chemical structures and toxicological characteristics.

multiple categories of constituents in sediment. In the former East Flume, potential risk to fish was posed by PAHs in sediment;
- There is no unacceptable risk for piscivorous birds based on food chain exposure; and
- Potential risk to piscivorous mammals is presented by dibenzo(a,h)anthracene and total PCBs via food chain exposure.

Potential ecological risks associated with the former East Flume, Harbor Brook, and Subsite drainage ditches have been mitigated by Subsite IRMs. As discussed in the FS Report (also see Figure 4)**,** the East Flume IRM, West Wall IRM, East Wall IRM, and Upper Harbor Brook IRM have mitigated (or will mitigate) risks posed to ecological receptors associated with exposure to surface water and sediment in Harbor Brook along the Subsite and in Subsite drainage ditches. Additionally, risks posed to ecological receptors resulting from exposure to shallow and intermediate groundwater (via discharge to surface water) has been mitigated by the Upper Harbor Brook IRM.

**Lakeshore Wetland Exposure Area**, including delineated wetlands located contiguous to Onondaga Lake within the Lakeshore Area:

- Potential risks to terrestrial plants is posed by metals;
- Potential risk to soil invertebrates is posed by metals, two SVOCs, and two VOCs;
- Potential risk to aquatic organisms is posed by dissolved metals and SVOCs based upon a comparison of groundwater data to surface water values protective of aquatic organisms;
- Potential risk to benthic invertebrates via exposure to sediment is demonstrated by exceedances of screening criteria in multiple categories of constituents;
- Potential risk to fish is presented by metals and SVOCs in sediments and based upon a comparison of groundwater data to surface water values protective of the fish community;
- Overall risk for piscivorous birds is based on food chain exposure and associated with risk to metals, pesticides, and SVOCs; and
- Potential risk to piscivorous mammals is posed primarily by PAHs and BEHP via food chain exposure.

As discussed in the FS Report (also, see Figure 4), the IRM activities associated with the West Wall IRM, East Wall IRM, Upper Harbor Brook IRM, and Outboard Area IRM have mitigated (or will mitigate) risks posed to ecological receptors associated with exposure to wetlands contiguous with Onondaga Lake.

A full discussion of the BERA evaluation and conclusions is presented in the 2011 BERA Report.

***Summary of Human Health and Ecological Risks***

The results of the human health risk assessment indicate that the contaminated soil, indoor air, and groundwater present current and/or potential future unacceptable exposure risk and the ecological risk assessment indicates that the contaminated soils pose an unacceptable exposure risk. While some of the risks associated with contaminated soil have been mitigated in part by the implemented IRMs, the calculated risks are still considered to be valid as the IRM components relating to placement of clean cover materials did not address all site areas and are not necessarily final actions. Moreover, while potential ecological and human health risks associated with Harbor Brook and Subsite drainage ditches have been mitigated by Subsite IRMs, conditions which could potentially result in a return to unacceptable risks for sediment or surface water in Harbor Brook and/or the Subsite drainage ditches may occur should O&M activities for the IRMs be discontinued.

***Basis for Action***

Based upon the quantitative human-health risk assessment and ecological evaluation, EPA has determined that actual or threatened releases of hazardous substances from the Subsite, if not addressed, may present a current or potential threat to human health and the environment.

## REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as ARARs, to-be-considered (TBC) guidance, and site-specific, risk-based levels established using the risk assessments. The following RAOs have been established for the Subsite:

- Prevent, or reduce to the extent practicable, ingestion/direct contact with contaminated soil/fill material to be protective under the current and reasonably anticipated future land uses.
- Prevent, or reduce to the extent practicable, inhalation of or exposure to contaminants volatilizing from contaminated soil/fill material and groundwater, as well as unacceptable inhalation exposure associated with soil vapor.
- Prevent, or reduce to the extent practicable, potential unacceptable risks to human health associated with ingestion of shallow and intermediate groundwater with contaminant levels exceeding drinking water standards.
- Restore groundwater outside of the WMA to levels that meet state and federal standards within a reasonable time frame.
- Prevent, or reduce to the extent practicable, potential unacceptable risks to

human health associated with contact with, or inhalation of, volatiles from contaminated shallow and intermediate groundwater.

- Prevent, or reduce to the extent practicable, the release of Subsite-related contaminants to groundwater, surface water and sediment that may cause unacceptable adverse effects on groundwater, surface water, or sediment quality in Harbor Brook or Onondaga Lake.
- Prevent, or reduce to the extent practicable, adverse impacts to biota from ingestion/direct contact with contaminated soil/fill material causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

NYSDEC's SCOs have been identified as remediation goals for soil to attain these RAOs. SCOs are risk-based criteria that have been developed by the State, and the levels are consistent with what EPA has determined are acceptable levels of risk that are protective of human health, ecological exposure, or the groundwater depending upon the existing and anticipated future use of the Subsite. While the land use of the Subsite has historically been industrial, current and anticipated future uses of some areas could include commercial or recreational uses. Groundwater remedial goals are the New York State Ambient Water Quality Standards. IRMs to address surface water and sediment throughout the Subsite have eliminated exposure to these media. Cleanup goals were not specifically developed for them, but maintenance of the IRMs is expected to achieve the RAO. The ARARs, TBCs, and other guidelines for the selected remedy are provided in Table 9.

## SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. § 9621(d)(4).

Based on anticipated future development of the Subsite, expectations of the reasonably-anticipated future land use, as described above, were considered in the FS to facilitate the development of remedial alternatives. The reasonably anticipated land use includes passive recreational and/or ecological use for the Lakeshore area and industrial/commercial use and/or to provide additional State Fair parking for portions of the property south of I-690 (Penn-Can Property, Railroad Area).

All the alternatives, other than Alternative 1 - No Further Action, include the continuation of the O&M for the IRMs that have been implemented at the Subsite, other than the East Wall and Outboard Area IRMs.[10] Maintenance for the IRMs would include monitoring to document that established criteria are met and to identify the need for corrective action(s), if warranted. Corrective actions for cover systems may consist of cover repair in areas of disturbance or re-application of vegetation, as necessary.[11] For all the alternatives other than the No-Further-Action alternative, all of the RAOs, except restoring groundwater outside the WMA (i.e., outboard of the barrier wall/groundwater collection systems at the Subsite) to levels that meet state and federal standards, would be met following construction and implementation of appropriate institutional controls (e.g., approximately 1 to 6 years). The estimated time to restore groundwater outside the WMA to State and federal standards for all the alternatives, other than the No-Further-Action alternative, ranges from approximately 100 to 700 years. These estimates, which are discussed above, used available data for groundwater and porewater collected from beneath the lake, and were based on conservative assumptions. Additional data (e.g., groundwater) will be collected to refine the estimated timeframe for restoration and long- term monitoring will be performed.

The remedial alternatives are as follows:

**Alternative 1 - No Further Action**

The Superfund program requires that the "no action" alternative be considered as a baseline for comparison with the other alternatives. The no further action remedial alternative would not include any additional remedial measures to address the soil/fill material and shallow and intermediate groundwater contamination at the Subsite.

Because this alternative would result in contaminants remaining above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years. If justified by the review, remedial actions may be required in the future to remove, treat, or contain the contaminated media.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

Capital Cost: $0

[10] As noted in the discussion under IRMs, the East Wall and the Outboard Area IRMs do in fact require continued O&M, but those required activities were documented in RADs issued in 2011 and 2012, respectively, so they need not be included in this decision document.
[11] The annual O&M cost estimates are included in the cost estimates for each of the action alternatives.

Annual O&M Cost: $0

Present-Worth Cost: $0

**Alternative 2 – Cover System with Shallow/Intermediate Groundwater Restoration via MNA at the POC**

Alternative 2 includes the placement of a cover system with vegetation enhancement on surface soil that exceed the SCOs for commercial or industrial reasonably-anticipated future land uses at the Subsite (see Figure 6). This alternative also includes the continuation of O&M for IRMs that have been implemented at the Subsite and an evaluation of the presence of DNAPL at the Penn-Can Property. Following the completion of the DNAPL investigation, if recoverable DNAPL is encountered, DNAPL would be recovered using deep recovery wells or other applicable methods.

A minimum 1-foot thick soil/granular cover (or maintained paved surfaces and buildings) would be placed over approximately 35 acres for the purposes of minimizing erosion and mitigating potentially unacceptable exposure of human receptors to constituents that exceed NYCRR Part 375 commercial or industrial SCOs in surface soil/fill material. The need for a demarcation layer between the soil cover and the underlying substrate would be evaluated during the design. Additional actions, such as stabilization or removal, would be incorporated, if necessary, in the areas where surficial tar material is present, such that this material is effectively addressed to meet the RAOs. The cover system and vegetation enhancements would require routine maintenance and inspections to maintain cover integrity.

Where SCOs are not exceeded in surface soil but where they are exceeded at depth (approximately 21 additional acres), vegetation enhancement would be implemented to supplement the existing vegetation and to reduce erosion of surface soil/fill material. Sampling would be performed to determine the appropriate cover and its limits.

Fill material brought to the Subsite would need to meet the requirements for the identified Subsite use (*e.g.,* commercial or industrial). Native species would be used for the vegetative component of covers. To develop cost estimates, the seed application is anticipated to consist of a grassland seed mix that is native to New York State and is selected for its ability to attain relatively high growth rates and ecological function.

Sidewalks, pavement, and structures, such as buildings, as part of future development, could serve as acceptable substitutes for any of the vegetated covers described above.

Clean fill staging areas, which supported the IRMs and/or the Onondaga Lake Bottom OU projects, were constructed at the Subsite. Restoration and final cover thicknesses would be evaluated, and existing cover thickness may be supplemented with additional cover material to meet the 1-foot minimum thickness required for the intended use of these areas (*i.e.,* commercial, industrial).

Because future Subsite development plans have not been determined for portions of the Subsite, the boundaries of the covers are conceptual and presented for cost estimation purposes. A portion of the Penn-Can Property may be used for overflow parking for the New York State Fairgrounds, while an approximately ¾-mile extension of the "Onondaga Loop the Lake" trail will cross a portion of the Lakeshore Area and AOS #1. The extent of covers would be determined during the design phase. The conceptual extent of the Subsite cover system is depicted on Figure 6.

Institutional controls in the form of environmental easements and/or restrictive covenants would be used to limit land use to commercial (including passive recreational)/industrial, as appropriate, to prevent the use of groundwater without approved treatment, and to require that any intrusive activities in areas where contamination remains be conducted in accordance with a NYSDEC-approved SMP, which would include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Subsite and documents the steps and media-specific requirements necessary to ensure that the following institutional and engineering controls remain in place and effective:

    - environmental easements and/or restrictive covenants described above;
    - Subsite cover systems (*e.g.,* existing IRM covers) described above;
    - excavation plan that details the provisions for management of future excavations in areas of remaining contamination;
    - descriptions of the provisions of the institutional controls, including any land use or groundwater use restrictions;
    - provision that future, on-Subsite occupied buildings should include either vapor intrusion sampling and/or installation of mitigation measures, as necessary;
    - provisions for the management and inspection of the implemented engineering controls;
    - maintaining Subsite access controls and NYSDEC notification; and
    - steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The final monitoring program would be established during the design.

The alternative includes continued monitoring and maintenance associated with IRM elements noted above that pertain to the Subsite (*e.g.,* West Barrier Walls and Upper

Harbor Brook IRMs).

As summarized in Section 2.2 of the FS Report, the vertical hydraulic conductivity of the Solvay waste unit present at the Subsite is generally less than 1 x $10^{-5}$ cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than 1 x $10^{-5}$ cm/sec). The proposed cover materials in combination with the underlying soil/fill material (*e.g.,* Solvay waste) and continued O&M of the groundwater collection system for Subsite groundwater would meet the requirements for containment under RCRA Subtitle D, which would be an ARAR for this action.

This alternative includes restoration of shallow/intermediate groundwater at the POC via MNA. An evaluation of the shallow and intermediate groundwater using data collected in 2017 to support an investigation of deep groundwater indicated that natural attenuation is occurring within the shallow and intermediate groundwater. Based on multiple lines of evidence, degradation of groundwater organic constituents is occurring in shallow and intermediate groundwater. Further evaluation of MNA would need to be conducted as part of the preliminary remedial design and/or O&M.

Because this alternative would result in contaminants remaining above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time for this alternative is 1 to 2 years.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---:|
| Capital Cost: | $9,600,000 |
| Annual O&M Cost: | $586,000 |
| Present-Worth Cost: | $16,900,000 |

**Alternative 3 – Enhanced Cover System with Wetland Construction/Restoration and Shallow/Intermediate Groundwater Restoration via MNA at the POC**

Alternative 3 includes all the components of Alternative 2 and includes two additional components: that the cover systems would also be constructed to cover surface soil that exceeds the SCOs for commercial, industrial, or ecological reasonably-anticipated future land uses at the Subsite, and that a wetland near wetland area WL2 on the northeastern shoreline of Wastebed B (see Figure 7) would be constructed/restored.

The cover systems would consist of a minimum of 1-foot with up to 2-feet thick soil/granular cover (or maintained paved surfaces and buildings), applied over approximately 35 acres for the purposes of minimizing erosion and mitigating potentially unacceptable exposure of human and/or ecological receptors to constituents exceeding SCOs in soil/fill material. The extent, thickness, and permeability of covers would be determined during the design phase and/or during site management, if site uses change, as necessary.

The wetland construction/restoration is intended to mitigate for wetland acreage lost as a result of implementation of the Wastebed B/Harbor Brook IRM, and it would total approximately 1 acre and include the installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material to reduce infiltration and discharge of groundwater to surface water during seasonally high groundwater levels concurrent with high lake levels.

Because this alternative would result in contaminants remaining above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time of this alternative is 2 to 3 years.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $11,800,000 |
| Annual O&M Costs: | $591,000 |
| Present-Worth Cost: | $19,100,000 |

**Alternative 4 – Enhanced Cover System with Wetland Construction/Restoration, *In-Situ* Treatment and Shallow/Intermediate Groundwater Restoration via MNA at the POC**

Alternative 4 is similar to Alternative 3, except that instead of the installation of a low permeability liner on the northeastern shoreline of Wastebed B beyond the wetland footprint within an area of DNAPL-impacted soil/fill material (see Figure 8), this alternative would instead use *in-situ* treatment.

*In-situ* treatment of DNAPL-impacted soil/fill material would be completed over an approximately 2.2-acre area coinciding with the footprint and perimeter of the proposed area of wetland construction/restoration. For cost estimation purposes, *in-situ* geochemical stabilization (ISGS) has been assumed. ISGS provides partial mass destruction through chemical oxidation while also generating mineral precipitates to encapsulate remaining NAPL-impacted surfaces to reduce the mobility of remaining contaminants. The reagents would be applied by soil mixing to a depth of 10 feet bgs, based on the approximate extent of DNAPL-impacted soil/fill material. Treatment with ISGS is estimated to take approximately one month for stabilization to occur, after which wetland construction could be performed.

Because this alternative would result in contaminants remaining above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time of this alternative is 2 to 3 years.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $19,600,000 |
| Annual O&M Costs: | $591,000 |
| Present-Worth Cost: | $26,900,000 |

**Alternative 5 – Partial Excavation with Off-Subsite Disposal and Shallow/Intermediate Groundwater Restoration via MNA at the POC**

Alternative 5 includes the mechanical excavation of the soil/fill material that is above Unrestricted Use SCOs to depths ranging from 14 to 45 feet below grade depending on the depth of contamination in the area. No soil removal is assumed within 30 feet of I-690, State Fair Boulevard, and the CSX railroad line traversing the Subsite. Excavation would be conducted to achieve a minimum temporary slope of 1:2 where possible, with sheet piling installed along select portions such as the Lakeshore Area and removal of the IRM collection systems (*e.g.,* Upper Harbor Brook, East and West Walls) as necessary. Because of the required setbacks and sloping from adjacent features (*e.g.*, railways and roadways) some impacted material would remain following excavation. The excavated material would be transported off-Subsite for treatment/disposal. The excavated areas would be restored to the current grades and revegetated. The areas in the vicinity of I-690, State Fair Boulevard, the CSX railroad line traversing the Subsite, and various major utility corridors that exceed Unrestricted Use SCOs would be addressed with covers which meet RCRA Subtitle D cover requirements. Restoration would also include the reinstallation of the East Wall and West Wall collection systems, Harbor Brook surface water conveyance structures, and repair of a portion of the Onondaga Lake Bottom remedy to support the effectiveness of the Onondaga Lake Bottom remedy and to maintain Subsite stability as noted below. This alternative also includes the removal of the staged and capped materials in the Lakeshore area. This alternative is depicted on Figure 9.

The installation of temporary bulkhead walls within Onondaga Lake (and a temporary water treatment plant) would be necessary to support excavation activities and provide for water control in the excavation when excavating below lake level. Excavation of soil/fill material from the Lakeshore Area also necessitates measures to provide for continuous service to three Onondaga County sanitary sewers. For cost estimation purposes, it is assumed temporary bypass sewers would need to be installed during excavation activities and replaced following excavation.

For cost estimation purposes, it was assumed a total estimated 3.1 million cy of excavated soil/fill material would be transported off-Subsite for non-hazardous waste disposal. In addition, a volume of 75,000 cy was assumed to require off-Subsite incineration because of the presence of DNAPL. Based on a daily production rate of 2,400 cy per day for 10 months of the year; it is estimated that the material would be shipped off-Subsite in three to four construction seasons resulting in approximately 185,000 truckloads (145 truckloads per day).

Clean backfill would be transported via trucks from an off-Subsite borrow source to the Subsite, requiring an estimated 2 million cy (approximately 135,000 truck trips), to restore excavated areas to near existing grades. It is also assumed that the barrier walls and collection systems would be replaced for groundwater collection and maintenance of Subsite stability.

For cost estimation purposes, it is assumed that the Railroad and Penn-Can areas would be restored to existing grades, but that the lakeshore would be filled only to the extent necessary to suitably support I-690, utilities and allow for the reinstallation of the groundwater collection system components. It is assumed that in-lake capping would be necessary to repair (required in connection with the bulkhead barrier installation and subsequent removal) and expand the existing in-lake cap for the increased area requiring approximately 350,000 cy of capping materials (23,000 truck trips). As mentioned above, Onondaga County sanitary sewers would also be replaced as part of restoration activities following excavation.

This alternative would also include an evaluation for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property and monitoring, consistent with the remedial components described above in Alternative 2. If feasible, recoverable DNAPL would be collected and transported off-Subsite for treatment/disposal.

This alternative includes restoration of shallow/intermediate groundwater at the POC via MNA. Based on multiple lines of evidence, degradation of organic constituents is occurring in the shallow and intermediate groundwater via natural attenuation and degradation (e.g., biodegradation). Further evaluation of MNA would need to be conducted as part of the preliminary remedial design and/or O&M.

Long-term maintenance of the vegetated areas would be included. In areas where materials exhibiting concentrations greater than SCOs remain, institutional controls (*e.g.,* environmental easements, deed restrictions, and environmental notices), an SMP, and periodic reviews consistent with those described above in Alternative 2 would be necessary.

Because this alternative would result in contaminants remaining above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time of this alternative is 4 years.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $1,161,500,000 |
| Annual O&M Costs: | $538,000 |
| Present-Worth Cost: | $1,168,200,000 |

**Alternative 6 – Full Excavation with Off-Subsite Disposal and Shallow/Intermediate Groundwater Restoration via MNA**

This alternative represents restoration to pre-disposal conditions through full removal of all soil/fill material above Unrestricted Use SCOs and would remove portions of I-690, State Fair Boulevard, the CSX railroad line, IRMs (*e.g.,* Upper Harbor Brook, East and West Walls) as necessary and various major utility corridors to facilitate removal of the underlying contaminated soil/fill. Excavated material would be transported off-Subsite for treatment/disposal. Restoration would include backfill and restoration to the existing areas and grades and include rebuilding the removed portions of the highway, rail systems, and utility corridors. Restoration would also include reinstallation of the East Flume IRM sewer maintenance and East Wall and West Wall collection systems, Harbor Brook surface water conveyance structures, and repair of a portion of the Onondaga Lake Bottom cap to support the remedy's effectiveness and maintain Subsite stability as noted below. Long-term maintenance of vegetated areas would be included. This alternative also includes the removal of the staged and capped materials on the Lakeshore area. This alternative is depicted on Figure 10.

As necessary, institutional controls, an SMP, and periodic reviews, consistent with those described above in Alternative 2, would also be included.

Given the volume of traffic on this portion of I-690 (estimated at over 50,000 cars each day by the New York State Department of Transportation), re-routing to local streets for the duration of construction is not anticipated to be feasible or permitted. Therefore, it is anticipated that the construction of a temporary highway bypass over the Penn-Can Property would be required. An approximately one-mile section of I-690 and State Fair Boulevard has been assumed for removal and reinstallation with installation and subsequent removal of an approximately 2-mile temporary I-690 bypass, resulting in an additional quantity of approximately 180,000 tons of construction and demolition (C&D) material for disposal. Additionally, it is assumed that approximately 3 miles of railway would be rerouted during construction with the existing tracks removed as part of excavation.

Installation of temporary bulkhead walls within Onondaga Lake (and a temporary water treatment plant) would be necessary to support excavation activities and provide for water control in the excavation when excavating below lake level. Excavation of soil/fill material from the Lakeshore Area also necessitates measures to provide for continuous service to three Onondaga County sanitary sewers. For cost estimation purposes, it is assumed temporary bypass sewers would need to be installed during excavation activities and replaced following excavation.

For cost estimation purposes, it was assumed a total estimated 3.4 million cy of excavated soil/fill material would be transported off-Subsite for non-hazardous disposal. In addition, a volume of 75,000 cy was assumed to require off-Subsite incineration because of the presence of DNAPL. It was also assumed that 180,000 tons of C&D material would be transported off-Subsite for disposal resulting from roadway and railway demolition.

Based on a daily production rate of 2,400 cy per day for 10 months of the year; it is estimated that the material would be shipped off-Subsite in approximately four construction seasons resulting in approximately 210,000 truckloads (145 truckloads per day).

Clean backfill would be transported via trucks from an off-Subsite borrow source to the Subsite, requiring an estimated 2.3 million cy (approximately 150,000 truck trips), to restore excavated areas to near existing grades. It is also assumed that the barrier and collection systems would be replaced for groundwater collection and maintenance of Subsite stability.

For cost estimation purposes, it is assumed that the Railroad and Penn-Can areas would be restored to existing grades, but that the lakeshore would be filled only to the extent necessary to suitably support I-690, utilities and allow for the reinstallation of the groundwater collection system components. It is assumed that in-lake capping would be necessary to repair (required in connection with the bulkhead barrier installation and subsequent removal) and expand the existing in-lake cap for the increased area requiring approximately 350,000 cy of capping materials (23,000 truck trips). Onondaga County sanitary sewers would also be replaced as part of restoration activities following excavation.

I-690 and State Fair Boulevard would be rebuilt in the existing alignments, resulting in an additional approximately 8,000 truck trips to deliver the approximately 120,000 cy of materials to restore those facilities to match adjacent grades. Onondaga County sanitary sewers would also be replaced as part of restoration activities following excavation. Because this alternative would result in certain constituents remaining above levels that would otherwise allow for unlimited use and unrestricted exposure, institutional controls would be required.

This alternative would also include an evaluation for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property and monitoring, consistent with the remedial components described above in Alternative 2.

This alternative includes restoration of shallow/intermediate groundwater within the Subsite boundary and beyond the POC, but not within the ILWD. The basis for MNA is supported by an evaluation of the shallow and intermediate groundwater using data collected in 2017 to support an investigation of deep groundwater. Based on multiple lines of evidence, degradation of organic constituents is occurring in shallow and intermediate groundwater. Further evaluation of MNA would need to be conducted as part of the preliminary remedial design and/or O&M.

Implementation of this alternative is estimated to require 6 construction seasons.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $1,303,500,000 |
| Annual O&M Costs: | $538,000 |
| Present-Worth Cost: | $1,310,200,000 |

## COMPARATIVE ANALYSIS OF ALTERNATIVES

The detailed analysis required under the NCP consists of an assessment of the individual alternatives against each of the nine evaluation criteria (see below) and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet to be eligible for selection as a remedy. The next five criteria, criteria 3 through 7, are known as "primary balancing criteria." These criteria involve the assessment of factors between response measures so that the best option will be chosen given site-specific data and conditions. The final criteria, criteria 8 and 9, are known as "modifying criteria." Community and support agency acceptance are factors that are assessed by reviewing comments received during the public comment period, including new information made available after publication of the proposed plan that significantly changes basic features of the remedy with respect to scope, performance, or cost.

The evaluation criteria are:

1. Overall protection of human health and the environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
2. Compliance with ARARs evaluates whether the alternative would meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements that pertain to the Subsite, or provide grounds for invoking a waiver.
3. Long-term effectiveness and permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
4. Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies that an alternative may employ.
5. Short-term effectiveness considers the period needed to implement an alternative and the risks the alternative may pose to workers, residents, and the environment during implementation.
6. Implementability is the technical and administrative feasibility of implementing the alternative, including the availability of materials and services.
7. Cost includes estimated capital and annual operation and maintenance costs, as well as present-worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
8. State acceptance indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the selected response measure.
9. Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

A comparative analysis of these alternatives based upon the evaluation criteria noted above follows.

## Overall Protection of Human Health and the Environment

Alternative 1 would not provide protection of human health and the environment. Alternatives 2, 3, and 4 provide protectiveness through soil covers, institutional controls, and monitoring. As described below, Alternatives 3 and 4 would also achieve protectiveness through added thickness of covers. Alternatives 2, 3, and 4 include implementation of a soil/granular or asphalt cover on the Penn-Can Property, with long-term isolation of underlying impacted soil/fill material and addressing surficial tar material. Furthermore, Alternatives 3 and 4 include targeted implementation of a low permeability cover or *in-situ* treatment on the northeastern Lakeshore Area, respectively, for added protection of the environment. Alternatives 5 and 6 provide protectiveness through soil/fill material removal and institutional controls.

Alternatives 2 through 6 would satisfy the threshold criteria by providing protection of human health and the environment and by addressing RAOs. Alternatives 2 through 4 are consistent with current, intended, and reasonably anticipated future use of the Subsite. Alternatives 5 and 6 would support current, intended, and reasonably anticipated future land use; however, they would present significant short-term impacts to the surrounding community and result in substantial environmental impacts (*e.g.,* heavy truck traffic, significant rerouting of traffic, noise and emissions). While Alternative 2 would provide protectiveness of human health and the environment and is consistent with current, intended, and reasonably anticipated future use of the Subsite, Alternative 3's added cover thickness and low permeability liner installation on the northeastern portion of the Lakeshore Area would provide added protectiveness. Alternative 4 would provide equal protectiveness to Alternative 3; however, as summarized below, there are added cost and implementation challenges associated with *in-situ* ISGS on the northeastern Lakeshore Area.

## Compliance with ARARS

Chemical-, location-, and action-specific ARARs identified for consideration are summarized in Table 9. Consistent with the NCP preamble that indicates that for groundwater, "remediation levels generally should be attained throughout the contaminant plume, or at and beyond the edge of the waste management area when waste is left in place", attainment of chemical-specific groundwater ARARs is at the edge of a WMA. Thus, the POC for this Subsite is the northern boundary of the adjacent ILWD. The Subsite area is part of a WMA because the waste is a solid waste (*e.g.,* Solvay waste) containing COCs and would meet the requirements for containment under RCRA Subtitle D, which would be an action-specific ARAR under Alternatives 2 through 5. As summarized in Section 2.2 of the FS Report, the vertical hydraulic conductivity of the Solvay waste unit present at the Subsite is generally less than 1 x $10^{-5}$ cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than 1 x $10^{-5}$ cm/sec). The proposed cover materials in combination with the underlying soil/fill material (*e.g.,* Solvay waste) and continued O&M of the groundwater collection and treatment system for Subsite groundwater would meet the requirements for containment under RCRA Subtitle D.

Although off-Subsite shallow and intermediate groundwater (present under Onondaga Lake) is not currently or anticipated to be used, it is classified as potable water by the State of New York. Alternative 1 does not provide a means of addressing potential erosion of and exposure to soil/fill material exceeding chemical-specific ARARs in areas not covered by current grading activities, nor would they address restoration of shallow/intermediate groundwater. For Alternatives 2, 3, and 4, chemical-specific ARARs, TBCs, or other guidelines are addressed through limiting the potential for exposures to soil/fill material exceeding chemical-specific ARARs through cover systems, an SMP, monitoring, institutional controls, and continued O&M of IRMs. Alternatives 2 through 6 address DNAPL that may be recoverable (potential principal threat waste) through DNAPL monitoring and recovery. Recovered DNAPL would be sent off-Subsite for treatment/disposal consistent with the preference for treatment of principal threat waste under the NCP. In addition to the measures included in Alternative 2, Alternatives 3 and 4 include enhanced cover systems, while Alternative 3 includes focused implementation of a low permeability cover (northeastern Lakeshore Area) and Alternative 4 includes focused *in-situ* treatment (northeastern Lakeshore Area) to address chemical-specific ARARs. Alternatives 5 and 6 address chemical-specific ARARs through removal of soil/fill material.

No action- or location-specific ARARs were identified for Alternative 1. Institutional controls would be implemented in Alternatives 2 through 6 in general conformance with NYSDEC's DER-33[12] guidance. Additionally, cover systems in Alternatives 2, 3, and 4 would prevent erosion and exposure to soil/fill material. Cover systems would be implemented in general conformance with NYSDEC's DER-10[13] guidance. Construction and O&M activities in Alternatives 2 through 6 would be conducted in compliance with OSHA requirements. Procedures would be implemented to adhere to the location-specific ARARs related to federal and state requirements for cultural, archeological, and historical resources. The need for any additional cultural resources surveys, as required by the National Historic Preservation Act, would be evaluated during the remedial design. Additionally, proposed actions would be conducted in a manner consistent with Fish and Wildlife Coordination Act requirements for protection of Onondaga Lake. As necessary, proposed actions under Alternatives 2 through 6 would be implemented in general conformance with State and federal wetland and floodplain assessment requirements.

[12] See https://www.dec.ny.gov/docs/remediation_hudson_pdf/der33.pdf

[13] See https://www.dec.ny.gov/regulations/67386.html

With respect to action-specific ARARs, proposed cover system and excavation activities would be conducted consistent with applicable standards and practices; earth moving/excavation activities would be conducted consistent with air quality standards; transportation and disposal activities would be conducted in accordance with applicable State and federal requirements, by licensed and permitted haulers.

## Long-Term Effectiveness and Permanence

Alternative 1 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential exposure to contaminants. Alternatives 2 through 6 would provide long-term effectiveness and permanence. Residual risks associated with Alternatives 2 through 4 are adequately and reliably addressed through cover systems and institutional controls. In addition, continued operation of the DNAPL and groundwater collection systems are adequate and reliable methods of providing long-term effectiveness and permanence with respect to DNAPL and groundwater impacts from the Subsite. Alternatives 2, 3, and 4 have similar long-term fuel/energy consumption, greenhouse gas emissions, and impacts to water, ecology, workers, or the community associated with long-term maintenance of the remedies. Alternatives 5 and 6 provide for more and the most reliable long-term effectiveness and permanence, respectively, through removal.

Long-term O&M requirements in Alternatives 2 through 4 would result in minimal impact to the environment. Consistent with NYSDEC and EPA policies on green remediation, sustainability considerations alone should not be used to justify implementation of a no further action alternative or a less comprehensive alternative.

Conditions such as lake flooding associated with spring thaw events have occasionally inundated the East and West Barrier Wall collection trenches with additional water in the area where the trenches meet. Also, periods of significant precipitation have at times contributed additional water to the systems, causing water to pool behind the barrier walls, resulting in increased water in the trenches. The increased water in the collection systems adversely impacts their operation and effectiveness. The installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material under Alternative 3 would significantly reduce the frequency of these increased water conditions in the trenches and therefore provide greater long-term effectiveness than would Alternatives 2 and 4.

## Reduction in Toxicity, Mobility, or Volume Through Treatment

There would be no reduction in toxicity, mobility, or volume in soil/fill material under Alternative 1. Alternatives 2 through 6 would reduce the mobility of coal tar-like DNAPL primarily found on the Penn-Can Property and downgradient at Wastebed B through its recovery and treatment. Alternative 4 provides reduction in toxicity, mobility, and volume through treatment of a targeted area of stained soil containing PAHs associated with AOS #1 and wetland area WL2. Both the coal tar-like DNAPL and DNAPL-stained soil areas may exhibit characteristics of principal threat waste. Alternatives 5 and 6 would reduce mobility of COCs in soil/fill material through excavation of the material, and depending on the nature of the waste, disposal off-Subsite may require treatment.

**Short-Term Effectiveness**

Alternative 1 does not include any physical construction measures in any areas of contamination and, therefore, would present the least adverse impacts to remediation workers or the community because of its implementation. Worker and community risks during remedy implementation are marginally greater for Alternatives 3 and 4 as compared to Alternative 2. The added risks to workers and the community and the additional significant traffic impacts to the community make Alternatives 5 and 6 present greater short-term impacts as compared to the containment Alternatives 2 and 3 or the *in-situ* treatment associated with Alternative 4. The risks to remediation workers and nearby residents under Alternatives 2 through 6 would be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment. Alternatives 5 and 6 present added short-term risks to workers and the community when considering the significant traffic impacts to the community as compared to the other alternatives.

Alternatives 5 and 6 would result in significant truck traffic and related noise. Alternatives 5 and 6 would require the off-Subsite transport of over 185,000 and 210,000 truckloads, respectively, of contaminated material and which would potentially adversely affect local traffic and may pose the potential for traffic accidents, which in turn could result in releases of hazardous substances. In addition, Alternatives 5 and 6 would require over 150,000 and 180,000 truckloads, respectively, to bring clean fill and cover materials to the Subsite. The estimated number of truck trips required for the off-Subsite removal of excavated material and import of clean fill and other materials under Alternatives 5 and 6 would equate to approximately 1 truck entering or leaving the Subsite every 2 minutes during a 10-hour work day for a period of 4 to 6 years. In addition to the potentially significant adverse effects on local air quality and community traffic patterns, traffic of this magnitude is anticipated to result in significant adverse effects on conditions of roadways.

Because no remedial actions would be performed under Alternative 1, there would be no implementation time. It is estimated that Alternative 2 would require 1-2 years to implement, Alternatives 3 and 4 would require 2-3 years to implement, Alternative 5 would require 4 years to implement, and Alternative 6 would require 6 years to implement.

**Implementability**

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake. Alternatives 2 through 4 can be readily constructed and operated; the materials necessary for the construction of these alternatives are reasonably available, although under Alternative 4, the implementability of soil mixing is uncertain and would need to be further evaluated in the remedial design. Alternatives 2 through 6 would require coordination with other agencies, including NYSDEC, New York State Department of Transportation, New York State Department of Health (NYSDOH), EPA, the Town of Geddes, City of Syracuse, Onondaga County, property owners, and CSX (for Alternatives 5 and 6). The implementability of soil mixing included in Alternative 4 would need to be evaluated during the design for the Subsite. Alternatives 5 and 6 are significantly more difficult to implement than the other action alternatives. Specifically, there would be significant implementability limitations associated with obtaining appropriate disposal capacity for these very large volumes of material.

In addition, excavation considerations that would impact the implementability of Alternatives 5 and 6 include construction water management, slope stability, and the presence of existing utilities. Specifically:

- Construction water management would be problematic during excavation because large volumes of construction water are anticipated as a consequence of the excavations in proximity to Onondaga Lake and Harbor Brook. Construction water treatment capacity is not likely to be available at the Willis Avenue GWTP; therefore, a temporary treatment system would be required.
- Excavation near the active railroad would require the installation of shoring under Alternative 5. Alternative 6 would require the removal and relocation of the existing CSX railroad line. Excavation near the IRM barrier walls and collection systems at Wastebed B and along Harbor Brook would necessitate the removal and replacement of the collection systems and barrier walls. Also, the excavation of DNAPL to 45 feet bgs may adversely impact the collection systems and I-690. Installation of sheet piling to support excavation in this area would penetrate the lower clay confining unit and, thus, potentially allow a pathway for the vertical migration of DNAPL.
- Excavation at Wastebed B and the Penn-Can Property are also anticipated to be significantly limited by two active Onondaga County sewer force mains. In addition, a high-pressure gas line, fiber optic lines, and water lines are present along State Fair Boulevard near the Penn-Can Property.

**Cost**

The estimated present-worth costs were calculated using a discount rate of seven percent and a thirty-year time interval for post-construction monitoring and maintenance period. (Although O&M would continue as needed beyond the thirty-year period, thirty years is the typical period used when estimating costs for a comparative analysis.)

The estimated capital, annual O&M, and present-worth costs using a 7% discount factor for each of the alternatives are presented in the table below. The estimated costs for the action alternatives are directly related to the given alternative's corresponding total volumes of soil/fill material to be excavated.

| **Alternatives** | **Capital** | **Annual O&M** | **Total Present Worth** |
|---|---|---|---|
| 1 – No Further Action | $0 | $0 | $0 |
| 2 – Cover System with Shallow/Intermediate Groundwater Restoration via MNA at the POC | $9.6 million | $586,000 | $16.9 million |
| 3 – Enhanced Cover System with Wetland Construction/Restoration and Shallow/Intermediate Groundwater Restoration via MNA at the POC | $11.8 million | $586,000 | $19.1 million |
| 4 – Enhanced Cover System with Wetland Construction/Restoration, *In-Situ* Treatment and Shallow/Intermediate Groundwater Restoration via MNA at the POC | $19.6 million | $591,000 | $26.9 million |
| 5 – Partial Excavation with Off-Subsite Disposal and Shallow/Intermediate Groundwater Restoration via MNA at the | $1.2 billion | $538,000 | $1.2 billion |
| 6 – Excavation with Off-Subsite Disposal and Shallow/Intermediate Groundwater Restoration via MNA | $1.3 billion | $538,000 | $1.3 billion |

**<u>State Acceptance</u>**

NYSDEC is the lead agency for this Subsite and has prepared the ROD. EPA has determined that the selected remedy meets the requirements for a remedial action as set forth in CERCLA Section 121, 42 USC § 9621. As such, for the purpose of satisfying this remedy selection criterion of the NCP, NYSDEC, on behalf of New York State, supports the selected remedy. NYSDOH also supports the selection of this remedy; its letter of concurrence is attached (see Appendix IV).

**<u>Community Acceptance</u>**

Comments received during the public comment period are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

## PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site, wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The principal threat concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or will present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using those remedy-selection criteria that are described above. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

As was noted in the "Summary of Subsite Characteristics" section, above, DNAPL and stained soils were encountered in soil borings and test pits advanced during the investigations and other remedial work performed at the Subsite. In general, there are six areas of DNAPL, DNAPL-stained soils, or other visibly-contaminated materials that were encountered on the Subsite. Potential migration of the DNAPL has been addressed by IRMs. Some of these materials exhibit characteristics of principal threat waste.

Under Alternatives 2 through 6, DNAPL would continue to be collected, as feasible, through implementation of the West Wall, East Wall, and Upper Harbor Brook IRMs. Any DNAPL collected under the West and East Wall IRMs would undergo treatment with collected groundwater at the Willis Ave GWTP. Any collected DNAPL under the Harbor Brook IRM would be shipped offsite to a permitted facility for treatment/disposal. Also under Alternatives 2 through 6, a pre-design investigation would be conducted to evaluate the potential for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property. Following completion of the DNAPL investigation, if recoverable DNAPL is identified, DNAPL would be recovered using recovery wells. Any recovered DNAPL would be shipped offsite to a permitted facility for treatment/disposal. Alternatives 2 through 6 also include additional features (*e.g.,* stabilization, removal), if necessary, in the areas where surficial tar material is present on the Penn-Can Property, such that this material is effectively addressed to meet the RAOs.

# SELECTED REMEDY

***Summary of the Rationale for the Selected Remedy***

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, NYSDEC and EPA have determined that Alternative 3 - Enhanced Cover System with Wetland Construction/Restoration and Shallow/ Intermediate Groundwater Restoration via MNA at the POC, best satisfy the requirements of CERCLA Section 121, 42 U.S.C. § 9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, set forth at 40 CFR § 300.430(e)(9).

Alternatives 2 through 6 would be protective of human health and the environment and would address the RAOs; however, the implementability of soil mixing to include chemicals for stabilization included in Alternative 4 would need to be further evaluated for the Subsite. Also, Alternatives 5 and 6 are significantly more difficult to implement, present significant short-term impacts, and are the least cost-effective means of achieving the RAOs. Alternative 3 is more protective than Alternative 2, equally protective and less costly than Alternative 4, and more practicable and implementable than, and significantly less costly than Alternatives 5 and 6. As Alternative 3 includes the installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material, it would significantly reduce the frequency of increased water conditions in the East and West Barrier Wall Collection Systems associated with lake flooding and significant precipitation events, and therefore it will provide greater long-term effectiveness than would Alternatives 2 and 4.

Based on information currently available, NYSDEC and EPA believe that the selected alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. NYSDEC and EPA expect the selected alternative to satisfy the following statutory requirements of CERCLA Section121(b): 1) it will be protective of human health and the environment; 2) it will comply with ARARs; 3) it will be cost-effective; 4) it will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) it will satisfy the preference for treatment as a principal element (or justify not meeting the preference).

NYSDEC and EPA have determined that the selected remedy is protective of human health and the environment; can be readily constructed and operated, presents minimal potential short-term impacts to workers and the community, and is cost-effective. The selected remedy utilizes permanent solutions, alternative treatment technologies, and resource-recovery technologies to the maximum extent practicable.

***Description of the Selected Remedy***

The selected remedy, Alternative 3, includes the following components:

- An enhanced cover system with vegetation enhancement. The cover system will consist of a minimum of 1-foot with up to 2-feet thick soil/granular cover (or maintained paved surfaces and buildings), applied over approximately 35 acres to minimize erosion and mitigate potentially unacceptable exposure of human and ecological receptors to constituents exceeding SCOs in surface soil/fill material. The cover and/or the underlying soil material will meet the RCRA Subtitle D permeability standard.
- In areas where SCOs in surface soil are not exceeded and where existing covers and/or soil fill material meet the Subtitle D permeability standard, vegetation enhancement will be implemented (approximately 21 additional acres) to supplement the existing vegetation and to reduce erosion of the surface soil/fill material.
- Construction/restoration of an approximately 1-acre wetland in the vicinity of wetland area WL2 on the northeastern shoreline of Wastebed B. The wetland construction/restoration will include the installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material to reduce infiltration and discharge of groundwater to surface water during seasonally high groundwater levels concurrent with high lake levels.
- Additional features (*e.g.,* stabilization, removal) will be incorporated, if necessary, in the areas where surficial tar material is present, such that this material is effectively addressed to meet the remedial action objectives.
- An evaluation of the presence of DNAPL at the Penn-Can Property. Following the completion of the DNAPL investigation, if recoverable DNAPL is encountered, DNAPL would be recovered using deep recovery wells or other applicable methods.
- Continued O&M associated with the IRMs that have been implemented at the Subsite. The IRMs include the West Wall and Upper Harbor Brook groundwater collection systems and treatment at the Willis Avenue groundwater treatment plant and the existing capped areas addressed by the IRMs. Maintenance and monitoring of the Outboard Area IRM is included as part of Onondaga Lake monitoring. O&M of the East Wall IRM will continue pursuant to the 2011 NYSDEC and EPA *East Barrier Wall Interim Remedial Measure, Response Action Document*. Surface water and sediment monitoring in Harbor Brook and Subsite ditches will also continue under the Upper Harbor Brook IRM. Maintenance and monitoring for the IRMs will include monitoring to document that established criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance

or reapplication of vegetation, as necessary.[14]

- MNA of shallow/intermediate groundwater at the POC.

The remedy also includes institutional controls in the form of environmental easements and/or restrictive covenants that will restrict the land use to commercial (including passive recreational)/industrial use, restrict groundwater use and require that intrusive activities in areas where contamination remains are in accordance with a NYSDEC-approved SMP, which will include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Subsite and details the steps and media-specific requirements necessary to ensure that the following institutional and engineering controls remain in place and effective:

    - environmental easements and/or restrictive covenants described above
    - Subsite cover systems (*e.g.,* existing IRM covers) described above;
    - excavation plan that details the provisions for management of future excavations in areas of remaining contamination;
    - descriptions of the provisions of the institutional controls including any land use or groundwater use restrictions;
    - provision that future on-Subsite building construction should include either vapor intrusion sampling and/or installation of mitigation measures, if necessary;
    - provisions for the management and inspection of the implemented engineering controls;
    - maintaining Subsite access controls and NYSDEC notification; and
    - steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The final monitoring program would be established during design.

The Subsite is part of a WMA because the waste is a solid waste containing contaminants of concern and will meet the requirements for containment under RCRA Subtitle D. The vertical hydraulic conductivity of the Solvay waste unit present at the Subsite is generally less than 1 x $10^{-5}$ cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than 1 x $10^{-5}$ cm/sec). The cover materials in combination

[14] The annual O&M cost estimates associated with monitoring and maintenance of the East Barrier Wall and Outboard Area IRMs are included in the cost estimates for selected response actions identified in the 2011 and 2012 Response Action Documents, respectively. The annual O&M cost estimates associated with monitoring and maintenance of the other IRM elements cited here are included in the cost estimates.

with the underlying soil/fill material (*e.g.,* Solvay waste) and continued operation and maintenance (O&M) of the groundwater collection and treatment systems for Subsite groundwater will meet the requirements for containment under RCRA Subtitle D.

The remedy will include the restoration of shallow/intermediate groundwater at the WMA's POC via MNA. Based on multiple lines of evidence, degradation of organic constituents is occurring in the shallow and intermediate groundwater via natural attenuation and degradation (*e.g.,* biodegradation). Further evaluation of MNA will need to be conducted as part of the preliminary remedial design and/or O&M.

Sampling will be performed, as necessary, to determine the appropriate cover.

The need for a demarcation layer between the soil cover and the underlying substrate will be evaluated during the remedial design.

The cover system and vegetation enhancements will require routine maintenance and inspections to maintain cover integrity.

Fill material brought to the Subsite will need to meet the requirements for the identified Subsite use (commercial, industrial, or ecological). Native species will be used for the vegetative component of covers. To develop cost estimates, the seed application is anticipated to consist of a grassland seed mix that is native to New York State is and selected for its ability to attain relatively high growth rates and ecological function.

Pavement, sidewalks, or structures, such as buildings, as part of future development, could serve as acceptable substitutes for any of the vegetated cover types described above.

Clean fill staging areas, which supported the noted IRMs and/or the Onondaga Lake Bottom projects, were constructed at the Subsite. Restoration and final cover thicknesses will be evaluated and existing cover thickness may be supplemented with additional cover material to meet the minimum thickness required for the identified use.

Evidence of DNAPL and stained soils were encountered in soil borings and test pits advanced during the investigations at the Subsite. While off-Subsite DNAPL migration is currently being addressed by IRMs, a pre-design investigation will be conducted to evaluate the potential for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property. Following completion of the DNAPL investigation, if recoverable DNAPL is identified, DNAPL will be recovered using recovery wells.

Because future development plans have not been determined for portions of the Subsite, the boundaries of the covers are conceptual and presented for cost estimation purposes. A portion of the Penn-Can Property is anticipated to be used for overflow parking for the

New York State Fairgrounds, while an approximately ¾-mile extension of the "Onondaga Loop the Lake" trail will cross a portion of the Lakeshore Area and AOS #1. The extent, thickness, and permeability of covers will be determined during the design phase and/or during site management, if site uses change, as necessary.

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy-DER-31,[15] and EPA Region 2's Clean and Green Policy[16] will be considered for the selected remedy to reduce short-term environmental impacts. Green remediation best practices such as the following may be considered:

- Use of renewable energy and/or purchase of renewable energy credits to power energy needs during construction and/or O&M of the remedy
- Reduction in vehicle idling, including both on- and off-road vehicles and construction equipment during construction and/or O&M of the remedy
- Design of cover systems, to the extent possible, to be usable for alternate uses, require minimal maintenance (*e.g.,* less mowing), and/or be integrated with the planned use of the property
- Beneficial reuse of material that would otherwise be considered a waste
- Use of Ultra Low Sulfur Diesel.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

***Summary of the Estimated Remedy Costs***

The estimated capital cost of the selected remedy is $11.8 million; the annual O&M is $586,000; and the total present-worth cost (using a 7% discount rate) is $19.1 million. Table 8 provides the basis for the cost estimates for Alternative 3.

It should be noted that these cost estimates are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy. Changes to the cost estimate can occur as a result of new information and data collected during the design of the remedy.

***Expected Outcomes of the Selected Remedy***

The results of the HHRA indicate that the contaminated soil, indoor air, and groundwater

[15] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

[16] See http://epa.gov/region2/superfund/green_remediation

present current and/or potential future unacceptable exposure risk and the ecological risk assessment indicates that the contaminated soils pose an unacceptable exposure risk. While some of the risks associated with contaminated soil have been mitigated in part by the implemented IRMs, the calculated risks are still considered to be valid as the IRM components relating to placement of clean cover materials did not address all site areas and are not necessarily final actions. Moreover, while potential ecological and human health risks associated with Harbor Brook and Subsite drainage ditches have been mitigated by Subsite IRMs, conditions that could potentially result in a return to unacceptable risks for sediment or surface water in Harbor Brook and/or the Subsite drainage ditches may occur should O&M activities for the IRMs be discontinued. In addition, it is anticipated that the remedy will result in the restoration of shallow/intermediate groundwater at the POC via MNA.

The State of New York, Onondaga County, and the City of Syracuse have jointly sponsored the preparation of a land-use master plan to guide future development of the Onondaga Lake area (Syracuse-Onondaga County Planning Agency, 1998). The primary objective of land-use planning efforts is to enhance the quality of the Onondaga Lake area for recreational and commercial uses. Implementation of the remedy will aid this long-term planning effort by addressing concerns related to human exposure to contaminated sediments, soils, and surface water.

Under the selected remedy, potential risks to human health and the environment will be reduced to acceptable levels. Remediation goals for the COCs are presented in Tables 1, 2, and 3 in Appendix II. Remediation goals for surface soil will be met following construction and implementation of appropriate institutional controls (e.g., approximately 1 to 6 years). The estimated time to attain remediation goals for groundwater outside the WMA ranges from approximately 100 to 700 years. These estimates are based on available data for groundwater and porewater collected from beneath the lake, and were based on conservative assumptions. Additional data (e.g., groundwater) will be collected to refine the estimated timeframe for restoration and long-term monitoring will be performed.

## STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site.

For the reasons discussed below, NYSDEC and EPA have determined that the selected remedy meets these statutory requirements.

***Protection of Human Health and the Environment***

The results of the risk assessment indicate that, if no action is taken, the Subsite poses an unacceptable ecological and human health risk.

The selected remedy will reduce exposure levels to protective levels or to within EPA's generally acceptable risk range of $10^{-4}$ to $10^{-6}$ for carcinogenic risk and below the HI of 1 for noncarcinogens. The implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts that cannot be mitigated. The selected remedy will be protective of human health and the environment in that the construction of cover systems over contaminated soil will preclude potential human exposure to contamination in soil. Combined with institutional controls, the selected remedy will provide protectiveness of human health and the environment over both the short- and long-term.

***Compliance with ARARs and Other Environmental Criteria***

The selected remedy will comply with the location-, chemical- and action-specific ARARs identified. The ARARs, TBCs, and other guidelines for the selected remedy are provided in Table 9.

***Cost-Effectiveness***

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of: the following: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness (discussed above) to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective and will achieve the cleanup levels in the same amount of time in comparison to the costlier alternatives.

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of the alternatives and related monitoring using a seven percent discount rate and a 30-year interval. The estimated capital, annual O&M, and total present-worth costs for the selected remedy are $11.8 million, $586,000; and $19.1 million, respectively.

Alternatives 2 through 6 would be protective of human health and the environment and would address the RAOs; however, the implementability of soil mixing to include chemicals for stabilization included in Alternative 4 would need to be further evaluated for the Subsite. Also, Alternatives 5 and 6 are significantly more difficult to implement, present significant short-term impacts, and are the least cost-effective means of achieving the RAOs. Alternative 3 is more protective than Alternative 2, equally protective and less costly than Alternative 4, and more practicable and implementable than Alternatives 5 and 6 at significantly less cost. As Alternative 3 includes the installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material, it would significantly reduce the frequency of increased water conditions in the East and West Barrier Wall Collection Systems associated with lake flooding and significant precipitation events, and therefore it will provide greater long-term effectiveness than would Alternatives 2 and 4.

***Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable***

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP Section 300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Subsite.

The selected remedy includes an evaluation of the potential to reduce the mobility of coal tar-like DNAPL primarily found on the Penn-Can property and downgradient at Wastebed B through its recovery and treatment. The remaining portions of the selected remedy will reduce mobility associated with erosion and infiltration of contaminants through cover systems, but they will involve no treatment. The selected remedy will permanently address the contamination.

***Preference for Treatment as a Principal Element***

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as a principal element (or justify not satisfying the preference). Under the selected remedy, contaminated groundwater and, as feasible, DNAPL, will continue to be collected through O&M of the West and East Wall IRMs and undergo treatment at the Willis Ave GWTP. Under the selected remedy, any NAPL collected under the Harbor Brook IRM will be sent off-Subsite to a permitted facility for treatment/disposal. Also under the selected remedy, a pre-design investigation will be conducted to evaluate the potential for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property. Following completion of the DNAPL investigation, if recoverable DNAPL is identified, DNAPL will be recovered using recovery wells. Any recovered DNAPL will be sent offsite to a permitted facility for treatment/disposal. The selected remedy also includes additional features (*e.g.,* stabilization, removal), if necessary, in the areas where surficial tar material is present on the Penn-Can Property, such that this material is effectively addressed to meet the RAOs.

***Five-Year Review Requirements***

The selected remedy, once fully implemented, will result in hazardous substances, pollutants, or contaminants remaining on-Subsite above levels that would otherwise allow for unlimited use and unrestricted exposure. Consequently, a statutory review will be conducted within five years after initiation of remedial action, and at five-year intervals thereafter, to ensure that the remedy is, or will be, protective of human health and the environment.

## DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan, released for public comment on July 25, 2018, identified Alternative 3, enhanced cover system with wetland construction/restoration and shallow/intermediate groundwater restoration via MNA at the POC, as the preferred alternative for the Subsite. Based upon its review of the written and verbal comments submitted during the public comment period, NYSDEC and EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

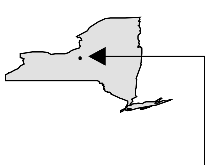
**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX I**

**FIGURES**

# FIGURE 1


HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY



MAP LOCATION

## SITE LOCATION

0 1,000 2,000 4,000
Feet

1:24,000

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SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.

PLOTDATE: 06/13/18 12:52:23 PM RozwodBJ

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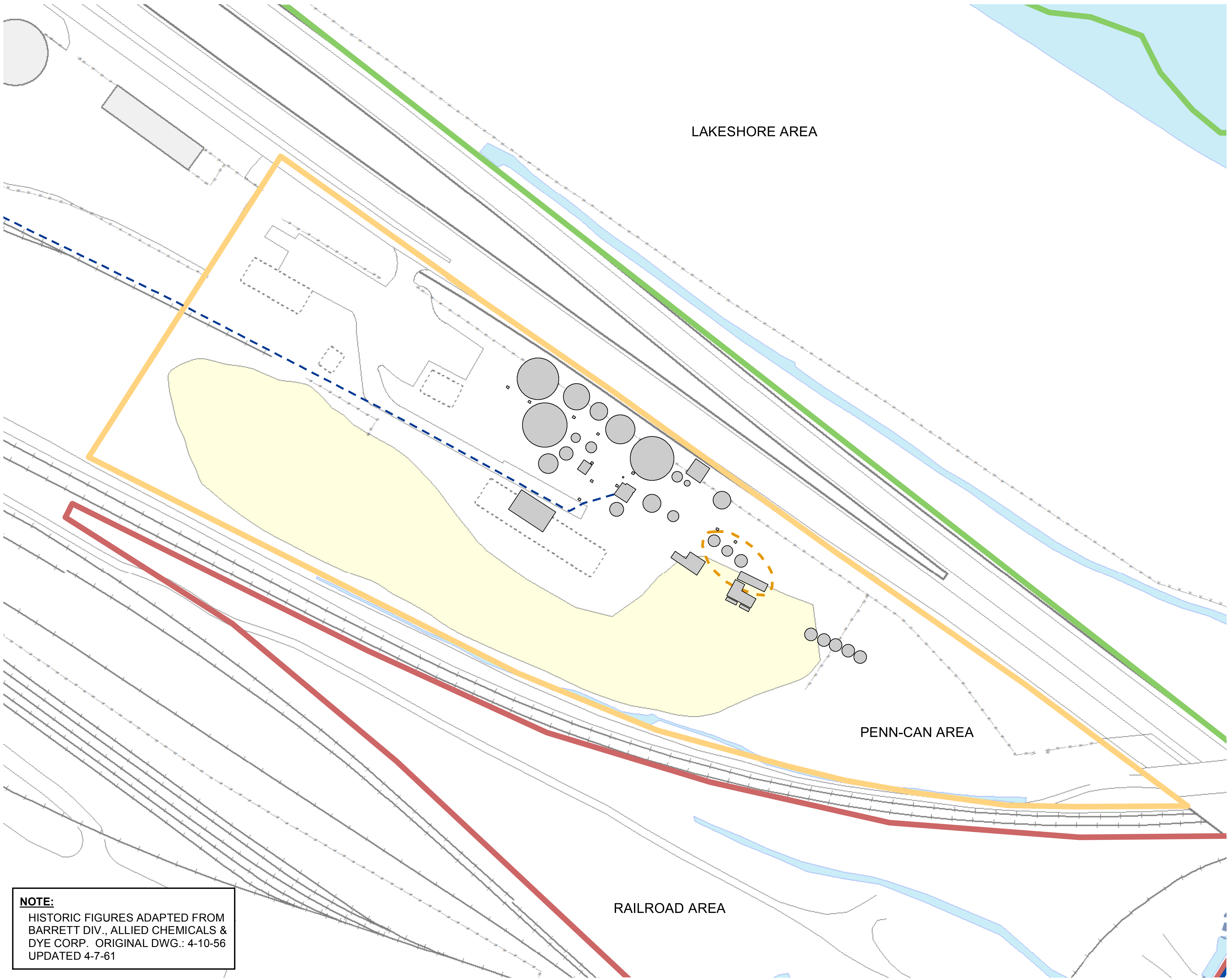



**NOTE:**
HISTORIC FIGURES ADAPTED FROM BARRETT DIV., ALLIED CHEMICALS & DYE CORP. ORIGINAL DWG.: 4-10-56 UPDATED 4-7-61

## LEGEND

- HISTORIC BARRETT PAVING PIPE (APPROXIMATE)
- EXISTING FENCELINE
- RAILROAD
- APPROXIMATE LOCATION OF FORMER BARRETT PAVING PIT
- HISTORIC BARRETT PAVING BUILDING LOCATION
- HISTORIC BARRETT PAVING TANK
- FORMER BUILDING (CONCRETE PAD REMAINS)
- HISTORIC BUILDING
- PENN-CAN PROPERTY FILL

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY

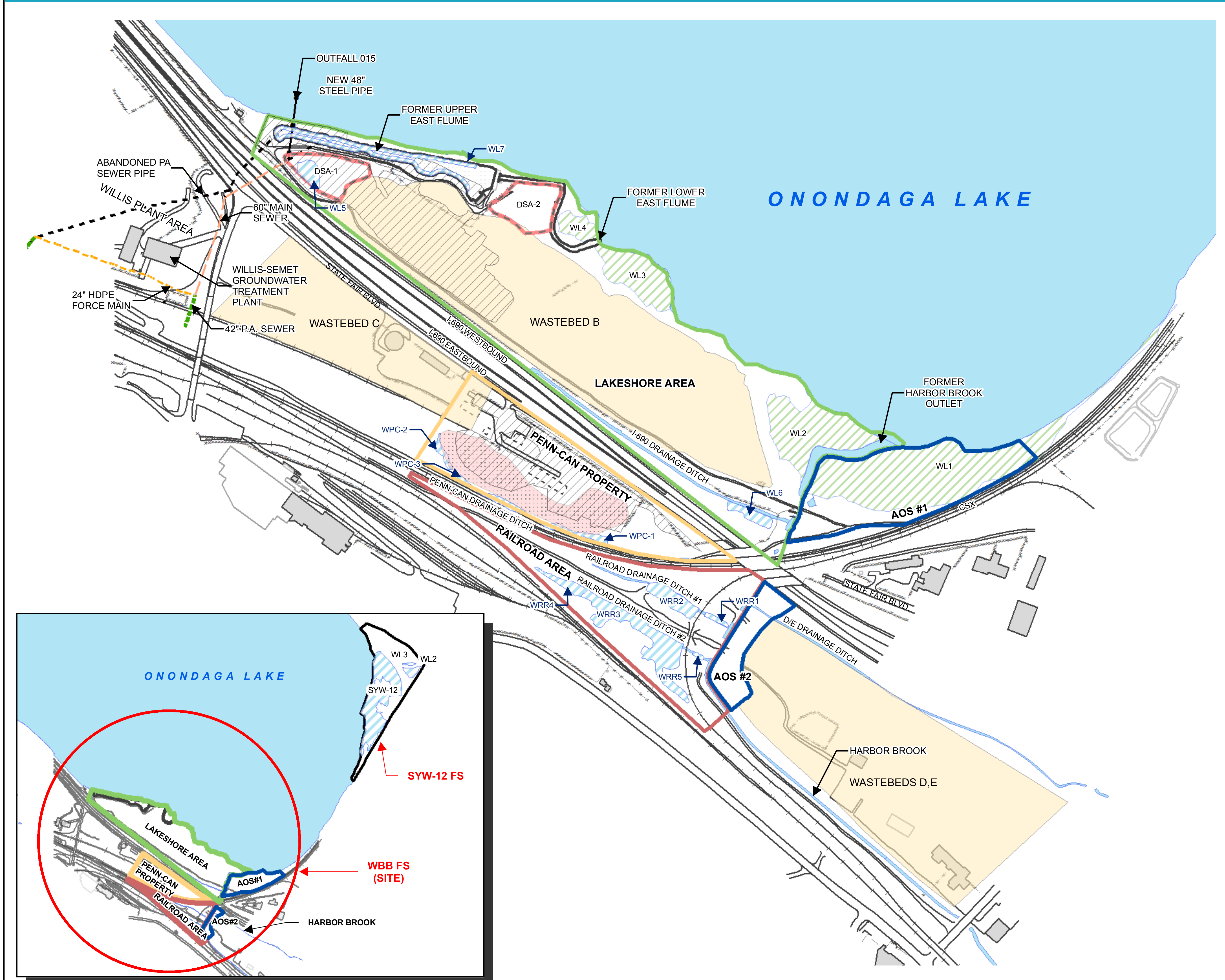
HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

# HISTORIC PENN-CAN PROPERTY FEATURES

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 3




N

## LEGEND

- LAKE REMEDY SUPPORT / STAGING AREA
- PENN-CAN PROPERTY FILL
- DELINEATED WETLAND
- BUILDING
- FORMER BUILDING (CONCRETE PAD REMAINS)
- HISTORIC BUILDING
- WASTEBED
- DREDGE SPOIL AREA BOUNDARY
- WETLANDS

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY
- SYW-12

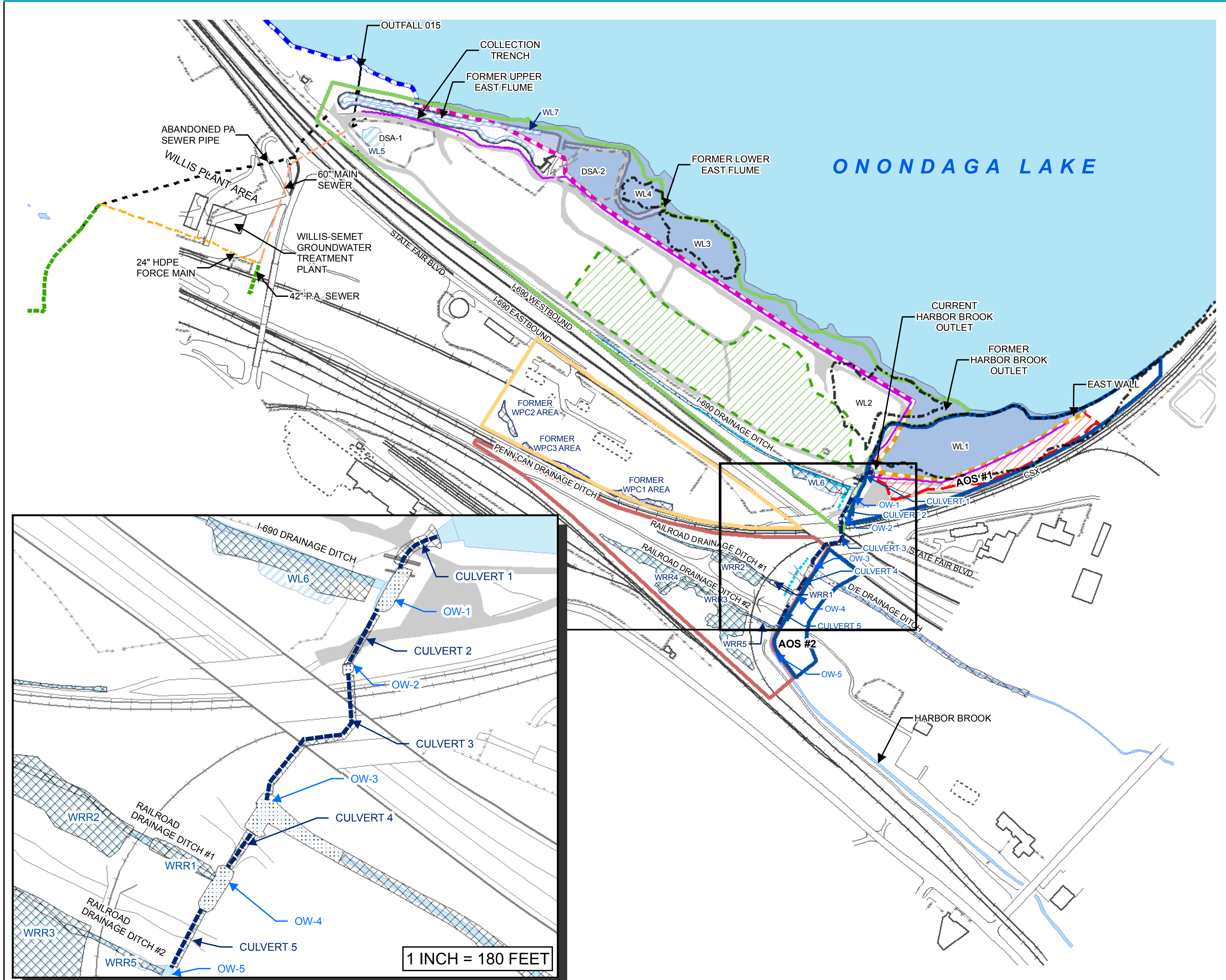
HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

## SITE PLAN

0 250 500 1,000
Feet

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.




N

## LEGEND

### IRM FEATURES

- COVER AREA
- STAGED MATERIAL
- SEDIMENT REMOVAL
- SEDIMENT REMOVAL WITH LINER
- OUTBOARD WETLAND TRANSITIONAL ZONE
- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- COLLECTION TRENCH
- UPPER HARBOR BROOK COLLECTION TRENCH
- CULVERT

### SITE FEATURES

- ACCESS PATHWAYS
- DELINEATED WETLAND
- BUILDING

### HISTORIC FEATURES

- HISTORIC/FORMER BUILDING
- DREDGE SPOIL AREA BOUNDARY
- FORMER WETLANDS

### SITE BOUNDARIES

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

## IRMs AND SITE CHANGES

0 250 500 1,000
Feet

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.


N

## LEGEND

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IRM AREA
- CONCEPTUAL ONONDAGA COUNTY WEST SHORE TRAIL (PROPOSED BY OTHERS)
- AREA ADDRESSED BY LAKE REMEDY
- IN-LAKE WASTE DEPOSIT
- WASTE MANAGEMENT AREA

SITE BOUNDARIES

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY
- GENERAL GROUNDWATER FLOW DIRECTION

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

**WASTE MANAGEMENT AREA AND GROUNDWATER POINT OF COMPLIANCE**

0 225 450 900
Feet

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.

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**LEGEND**

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- WASTE MANAGEMENT AREA
- IRM AREA
- CONCEPTUAL ONONDAGA COUNTY WEST SHORE TRAIL (PROPOSED BY OTHERS)
- AREA ADDRESSED BY LAKE REMEDY
- 1-FT ENGINEERED COVER
- AREA ADDRESSED BY EXISTING FILL
- VEGETATION ENHANCEMENTS

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 2 -**
**COVER SYSTEM WITH SHALLOW/ INTERMEDIATE GROUNDWATER RESTORATION VIA MNA AT POC**

0 225 450 900
Feet

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.

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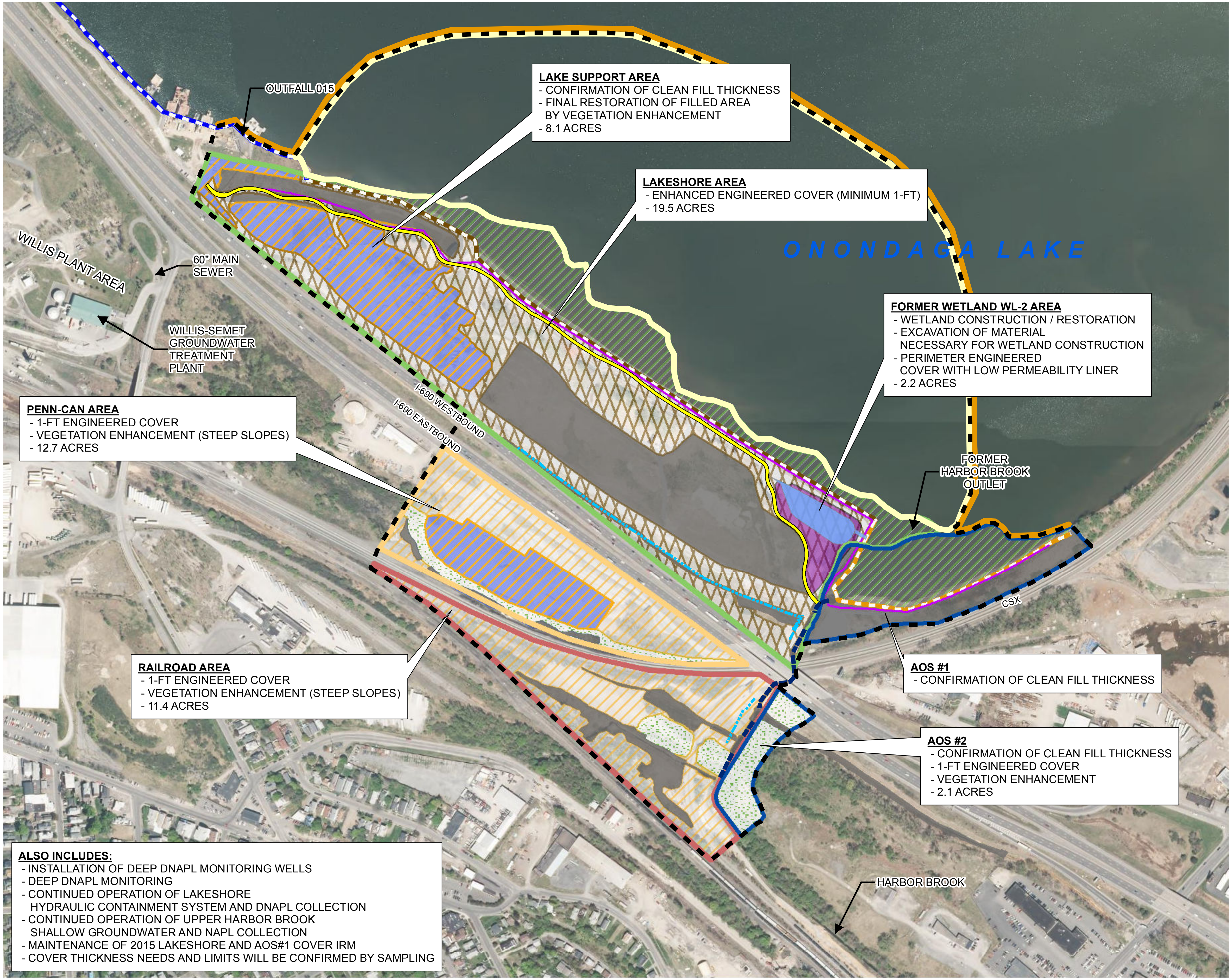
# FIGURE 7

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## LEGEND

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- WASTE MANAGEMENT AREA
- IRM AREA
- CONCEPTUAL ONONDAGA COUNTY WEST SHORE TRAIL (PROPOSED BY OTHERS)
- ENHANCED ENGINEERED COVER
- 1-FT ENGINEERED COVER
- AREA ADDRESSED BY EXISTING FILL
- VEGETATION ENHANCEMENTS
- AREA ADDRESSED BY LAKE REMEDY / IRM
- LOW PERMEABILITY LINER BELOW COVER
- WETLAND CONSTRUCTION / RESTORATION

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

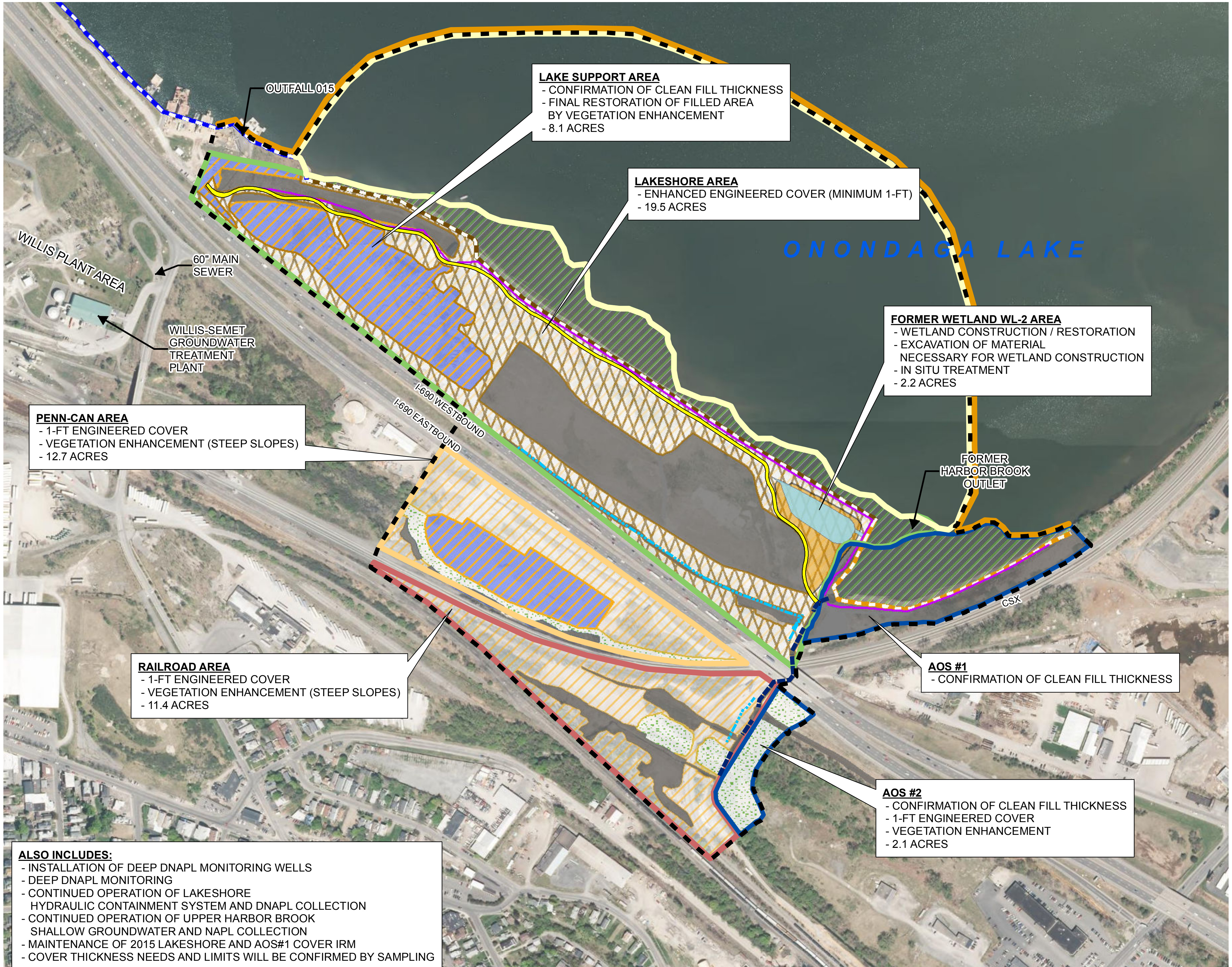
**ALTERNATIVE 3 - ENHANCED COVER SYSTEM WITH WETLAND CONSTRUCTION / RESTORATION AND SHALLOW / INTERMEDIATE GROUNDWATER RESTORATION VIA MNA AT POC**

0 225 450 900
Feet

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 8

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## LEGEND

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- WASTE MANAGEMENT AREA
- IRM AREA
- CONCEPTUAL ONONDAGA COUNTY WEST SHORE TRAIL (PROPOSED BY OTHERS)
- ENHANCED ENGINEERED COVER
- 1-FT ENGINEERED COVER
- AREA ADDRESSED BY EXISTING FILL
- VEGETATION ENHANCEMENTS
- IN SITU TREATMENT
- AREA ADDRESSED BY LAKE REMEDY / IRM
- WETLAND CONSTRUCTION / RESTORATION

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 4 - ENHANCED COVER SYSTEM WITH WETLAND CONSTRUCTION / RESTORATION, IN SITU TREATMENT AND SHALLOW / INTERMEDIATE GROUNDWATER RESTORATION VIA MNA AT POC**

0 225 450 900
Feet

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.

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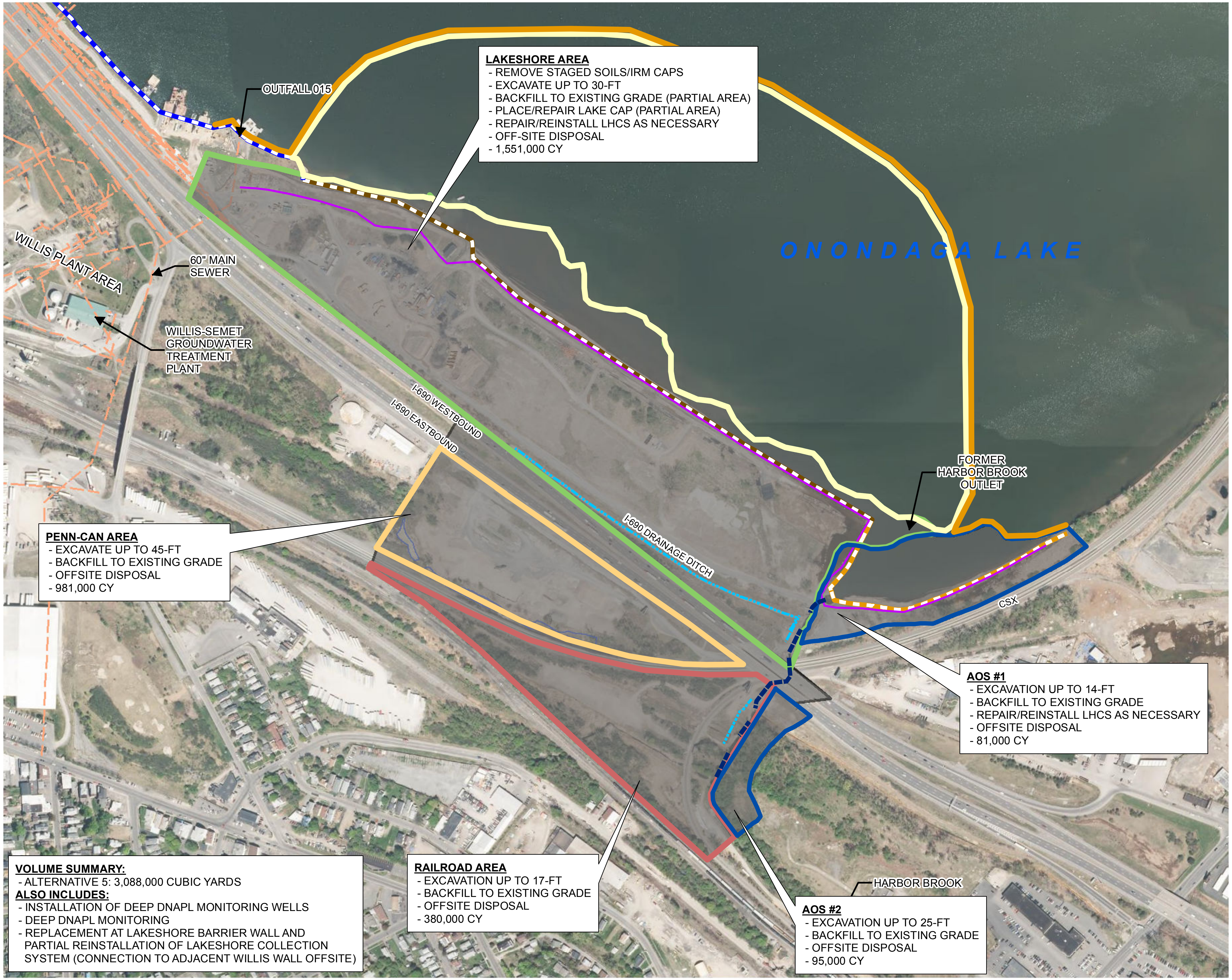
FIGURE 9




N

## LEGEND

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- EXCAVATION

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

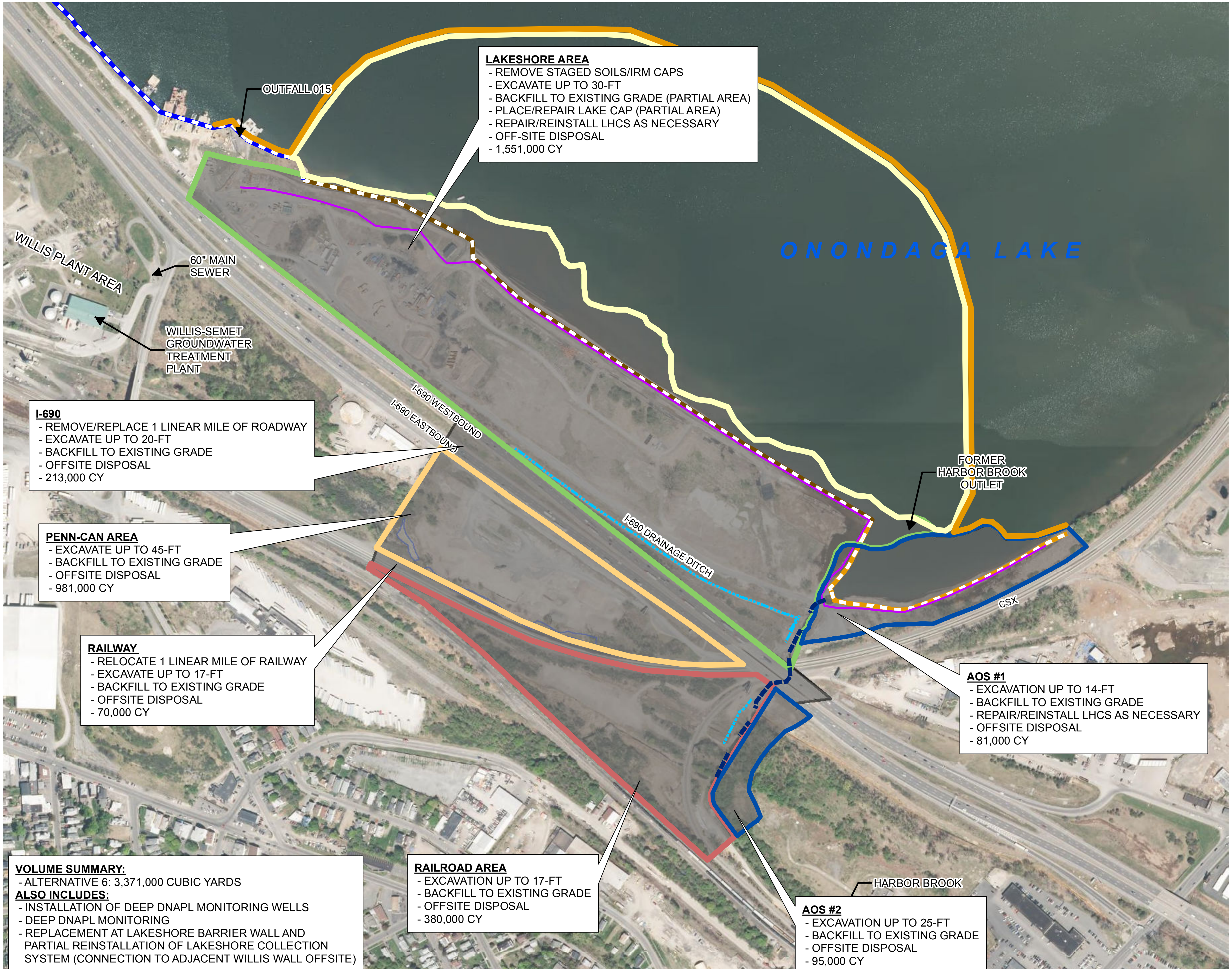
HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 5 - PARTIAL EXCAVATION WITH OFF-SITE DISPOSAL AND SHALLOW / INTERMEDIATE GROUNDWATER RESTORATION VIA MNA AT POC**

0 225 450 900
Feet

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.

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**LEGEND**

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- EXCAVATION

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
RECORD OF DECISION
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 6 - FULL EXCAVATION WITH OFF-SITE DISPOSAL AND SHALLOW / INTERMEDIATE GROUNDWATER RESTORATION VIA MNA**

0 225 450 900
Feet

SEPTEMBER 2018
1163.61858

O'BRIEN & GERE ENGINEERS, INC.

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**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX II**

**TABLES**

Table 1

Wastebed B/Harbor Brook Site

Surface Soils (0-2 ft bgs)

Summary of Detected Concentrations and Part 375 Restricted Use SCO Exceedances

| Parameter | Number of Samples | Number of Detects | Minimum Detected Conc. | Maximum Detected Conc. | NYSDEC Part 375 Unrestricted Use SCOs | Number of Unrestricted Use SCO Exceedances | NYSDEC Part 375 Restricted Use - Commercial SCOs | Number of Commercial SCO Exceedances | NYSDEC Part 375 Restricted Use - Industrial SCOs | Number of Industrial SCO Exceedances | NYSDEC Part 375 Restricted Use - Ecological SCOs | Number of Ecological SCO Exceedances |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds (μg/kg)** | | | | | | | | | | | | |
| 1,2-DICHLOROBENZENE | 54 | 15 | 1.00 | 7,600 | 1,100 | 1 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| 1,3-DICHLOROBENZENE | 53 | 5 | 1.00 | 7,000 | 2,400 | 1 | 280,000 | 0 | 560,000 | 0 | NC | NC |
| 1,4-DICHLOROBENZENE | 54 | 13 | 2.00 | 19,000 | 1,800 | 1 | 130,000 | 0 | 250,000 | 0 | 20,000 | 0 |
| ACETONE | 124 | 27 | 4.00 | 370 | 50 | 18 | 500,000 | 0 | 1,000,000 | 0 | 2,200 | 0 |
| BENZENE | 127 | 27 | 0.80 | 1,400 | 60 | 1 | 44,000 | 0 | 89,000 | 0 | 70,000 | 0 |
| CHLOROBENZENE | 128 | 35 | 1.00 | 3,400 | 1,100 | 1 | 500,000 | 0 | 1,000,000 | 0 | 40,000 | 0 |
| METHYLENE CHLORIDE | 128 | 13 | 1.70 | 160 | 50 | 3 | 500,000 | 0 | 1,000,000 | 0 | 12,000 | 0 |
| XYLENES, TOTAL | 118 | 34 | 0.60 | 2,100 | 260 | 4 | 500,000 | 0 | 1,000,000 | 0 | 260 | 4 |
| **Semivolatile Organic Compounds (μg/kg)** | | | | | | | | | | | | |
| 1,2-DICHLOROBENZENE | 125 | 41 | 7.60 | 210,000 | 1,100 | 25 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| 1,3-DICHLOROBENZENE | 125 | 11 | 2.60 | 3,700 | 2,400 | 2 | 280,000 | 0 | 560,000 | 0 | NC | NC |
| 1,4-DICHLOROBENZENE | 125 | 59 | 9.50 | 350,000 | 1,800 | 27 | 130,000 | 1 | 250,000 | 1 | 20,000 | 10 |
| 2-METHYLPHENOL | 123 | 1 | 2000 | 2,000 | 330 | 1 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| ACENAPHTHENE | 123 | 51 | 53.0 | 31,000 | 20,000 | 1 | 500,000 | 0 | 1,000,000 | 0 | 20,000 | 1 |
| BENZO(A)ANTHRACENE | 124 | 111 | 50.0 | 120,000 | 1,000 | 68 | 5,600 | 29 | 11,000 | 20 | NC | NC |
| BENZO(A)PYRENE | 125 | 111 | 56.0 | 100,000 | 1,000 | 73 | 1,000 | 73 | 1,100 | 72 | 2,600 | 48 |
| BENZO(B)FLUORANTHENE | 125 | 113 | 71.0 | 81,000 | 1,000 | 80 | 5,600 | 30 | 11,000 | 17 | NC | NC |
| BENZO(K)FLUORANTHENE | 124 | 106 | 46.0 | 94,000 | 800 | 65 | 56,000 | 2 | 110,000 | 0 | NC | NC |
| CHRYSENE | 125 | 113 | 65.0 | 110,000 | 1,000 | 72 | 56,000 | 2 | 110,000 | 0 | NC | NC |
| DIBENZO(A,H)ANTHRACENE | 123 | 73 | 55.0 | 22,000 | 330 | 44 | 560 | 35 | 1,100 | 26 | NC | NC |
| DIBENZOFURAN | 123 | 56 | 45.0 | 53,000 | 7,000 | 2 | 350,000 | 0 | 1,000,000 | 0 | NC | NC |
| FLUORANTHENE | 125 | 116 | 76.0 | 310,000 | 100,000 | 3 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| FLUORENE | 124 | 52 | 50.0 | 61,000 | 30,000 | 2 | 500,000 | 0 | 1,000,000 | 0 | 30,000 | 2 |
| HEXACHLOROBENZENE | 123 | 15 | 83.0 | 11,000 | 330 | 12 | 6,000 | 1 | 12,000 | 0 | NC | NC |
| INDENO(1,2,3-CD)PYRENE | 124 | 103 | 47.0 | 64,000 | 500 | 69 | 5,600 | 22 | 11,000 | 12 | NC | NC |
| NAPHTHALENE | 124 | 47 | 47.0 | 300,000 | 12,000 | 3 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| PHENANTHRENE | 125 | 110 | 54.0 | 210,000 | 100,000 | 2 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| PHENOL | 123 | 11 | 44.0 | 5,700 | 330 | 5 | 500,000 | 0 | 1,000,000 | 0 | 30,000 | 0 |
| PYRENE | 125 | 116 | 58.0 | 180,000 | 100,000 | 2 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| **Pesticides (μg/kg)** | | | | | | | | | | | | |
| 4,4'-DDD | 128 | 10 | 1.00 | 730 | 3.3 | 7 | 92,000 | 0 | 180,000 | 0 | 3.3 | 7 |
| 4,4'-DDE | 127 | 9 | 2.00 | 110 | 3.3 | 6 | 62,000 | 0 | 120,000 | 0 | 3.3 | 6 |
| 4,4'-DDT | 127 | 7 | 6.40 | 700 | 3.3 | 7 | 47,000 | 0 | 94,000 | 0 | 3.3 | 7 |
| DIELDRIN | 127 | 3 | 4.50 | 200 | 5 | 2 | 1,400 | 0 | 2,800 | 0 | 6 | 2 |
| HEXACHLOROBENZENE | 22 | 2 | 40.0 | 830 | 330 | 1 | 6,000 | 0 | 12,000 | 0 | NC | NC |
| **PCBs (μg/kg)** | | | | | | | | | | | | |
| AROCLOR-1016 | 127 | 12 | 3.00 | 2,000 | 100 | 3 | 1,000 | 1 | 25,000 | 0 | 1,000 | 1 |
| AROCLOR-1248 | 127 | 4 | 200 | 4,420 | 100 | 4 | 1,000 | 1 | 25,000 | 0 | 1,000 | 1 |
| AROCLOR-1254 | 127 | 23 | 6.00 | 6,000 | 100 | 17 | 1,000 | 5 | 25,000 | 0 | 1,000 | 5 |
| AROCLOR-1260 | 127 | 67 | 3.00 | 6,000 | 100 | 52 | 1,000 | 21 | 25,000 | 0 | 1,000 | 21 |
| **Metals (mg/kg)** | | | | | | | | | | | | |
| ARSENIC | 124 | 123 | 2.10 | 34.4 | 13 | 22 | 16 | 11 | 16 | 11 | 13 | 22 |
| BARIUM | 125 | 125 | 11.9 | 1,240 | 350 | 22 | 400 | 16 | 10,000 | 0 | 433 | 14 |
| CADMIUM | 122 | 75 | 0.03 | 121 | 2.5 | 37 | 9.3 | 26 | 60 | 9 | 4 | 30 |
| CHROMIUM | 125 | 125 | 4.30 | 391 | 30 | 66 | 1,500 | 0 | 6,800 | 0 | 41 | 53 |
| COPPER | 125 | 125 | 5.50 | 744 | 50 | 65 | 270 | 16 | 10,000 | 0 | 50 | 65 |
| LEAD | 125 | 125 | 6.10 | 2,320 | 63 | 79 | 1,000 | 7 | 3,900 | 0 | 63 | 79 |
| MERCURY | 127 | 121 | 0.04 | 64.3 | 0.18 | 101 | 2.8 | 51 | 5.7 | 35 | 0.18 | 101 |
| NICKEL | 125 | 125 | 9.10 | 104 | 30 | 48 | 310 | 0 | 10,000 | 0 | 30 | 48 |
| SELENIUM | 120 | 64 | 0.33 | 4.1 | 3.9 | 1 | 1,500 | 0 | 6,800 | 0 | 3.9 | 1 |
| SILVER | 124 | 43 | 0.15 | 91.9 | 2 | 29 | 1,500 | 0 | 6,800 | 0 | 2 | 29 |
| ZINC | 124 | 124 | 14.3 | 1,520 | 109 | 68 | 10,000 | 0 | 10,000 | 0 | 109 | 68 |

**NOTES**

This table presents (1) RI Report data only, (2) the detected concentration data only and (3) only parameters that exceeded the Part 375 Unrestricted, Restricted-Commercial, Restricted-Industrial or Restricted-Protection of Ecological SCOs.

NC = No criteria available

Table 2
Wastebed B/Harbor Brook Site
Subsurface Soils (>2 ft bgs)
Summary of Detected Concentrations and Part 375 Restricted Use SCO Exceedances

| Parameter | Number of Samples | Number of Detects | Minimum Detected Conc. | Maximum Detected Conc. | NYSDEC Part 375 Unrestricted Use SCOs | Number of Unrestricted Use SCO Exceedances | NYSDEC Part 375 Restricted Use - Commercial SCOs | Number of Commercial SCO Exceedances | NYSDEC Part 375 Restricted Use - Industrial SCOs | Number of Industrial SCO Exceedances | NYSDEC Part 375 Restricted Use - Ecological SCOs | Number of Ecological SCO Exceedances |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds (μg/kg)** | | | | | | | | | | | | |
| 1,2,4-TRIMETHYLBENZENE | 91 | 62 | 1.00 | 390,000 | 3,600 | 19 | 190,000 | 4 | 380,000 | 1 | NC | NC |
| 1,2-DICHLOROBENZENE | 127 | 38 | 1.00 | 920,000 | 1,100 | 18 | 500,000 | 1 | 1,000,000 | 0 | NC | NC |
| 1,3,5-TRIMETHYLBENZENE | 89 | 53 | 1.00 | 210,000 | 8,400 | 10 | 190,000 | 1 | 380,000 | 0 | NC | NC |
| 1,3-DICHLOROBENZENE | 121 | 16 | 2.00 | 41,000 | 2,400 | 7 | 280,000 | 0 | 560,000 | 0 | NC | NC |
| 1,4-DICHLOROBENZENE | 127 | 37 | 1.00 | 460,000 | 1,800 | 21 | 130,000 | 6 | 250,000 | 4 | 20,000 | 12 |
| 2-BUTANONE | 151 | 47 | 4.00 | 140 | 120 | 1 | 500,000 | 0 | 1,000,000 | 0 | 100,000 | 0 |
| ACETONE | 151 | 38 | 6.20 | 990 | 50 | 17 | 500,000 | 0 | 1,000,000 | 0 | 2,200 | 0 |
| BENZENE | 154 | 86 | 0.006 | 190,000 | 60 | 51 | 44,000 | 5 | 89,000 | 2 | 70,000 | 3 |
| CHLOROBENZENE | 155 | 41 | 0.07 | 120,000 | 1,100 | 14 | 500,000 | 0 | 1,000,000 | 0 | 40,000 | 4 |
| ETHYLBENZENE | 149 | 70 | 1.00 | 82,000 | 1,000 | 26 | 390,000 | 0 | 780,000 | 0 | NC | NC |
| METHYLENE CHLORIDE | 152 | 11 | 1.20 | 100 | 50 | 6 | 500,000 | 0 | 1,000,000 | 0 | 12,000 | 0 |
| N-PROPYLBENZENE | 89 | 19 | 1.00 | 11,000 | 3,900 | 2 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| NAPHTHALENE | 112 | 68 | 2.00 | 11,000,000 | 12,000 | 28 | 500,000 | 9 | 1,000,000 | 7 | NC | NC |
| SEC-BUTYLBENZENE | 88 | 16 | 1.00 | 18,000 | 11,000 | 2 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| TOLUENE | 151 | 89 | 0.70 | 450,000 | 700 | 39 | 500,000 | 0 | 1,000,000 | 0 | 36,000 | 12 |
| XYLENES, TOTAL | 151 | 106 | 0.60 | 990,000 | 260 | 71 | 500,000 | 4 | 1,000,000 | 0 | 260 | 71 |
| **Semivolatile Organic Compounds (μg/kg)** | | | | | | | | | | | | |
| 1,2-DICHLOROBENZENE | 119 | 18 | 230 | 2,700,000 | 1,100 | 14 | 500,000 | 1 | 1,000,000 | 1 | NC | NC |
| 1,3-DICHLOROBENZENE | 119 | 11 | 120 | 27,000 | 2,400 | 5 | 280,000 | 0 | 560,000 | 0 | NC | NC |
| 1,4-DICHLOROBENZENE | 118 | 21 | 91.0 | 3,400,000 | 1,800 | 15 | 130,000 | 3 | 250,000 | 2 | 20,000 | 9 |
| 2-METHYLPHENOL | 153 | 27 | 50.0 | 160,000 | 330 | 19 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| 4-METHYLPHENOL | 152 | 7 | 42.0 | 10,000 | 330 | 6 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| ACENAPHTHENE | 154 | 84 | 55.0 | 1,400,000 | 20,000 | 19 | 500,000 | 2 | 1,000,000 | 1 | 20,000 | 19 |
| ACENAPHTHYLENE | 154 | 80 | 44.0 | 850,000 | 100,000 | 4 | 500,000 | 1 | 1,000,000 | 0 | NC | NC |
| ANTHRACENE | 154 | 91 | 59.0 | 3,000,000 | 100,000 | 9 | 500,000 | 4 | 1,000,000 | 1 | NC | NC |
| BENZO(A)ANTHRACENE | 154 | 91 | 73.0 | 2,000,000 | 1,000 | 53 | 5,600 | 31 | 11,000 | 21 | NC | NC |
| BENZO(A)PYRENE | 153 | 80 | 70.0 | 1,400,000 | 1,000 | 44 | 1,000 | 44 | 1,100 | 44 | 2,600 | 33 |
| BENZO(B)FLUORANTHENE | 153 | 85 | 43.0 | 1,900,000 | 1,000 | 53 | 5,600 | 27 | 11,000 | 18 | NC | NC |
| BENZO(G,H,I)PERYLENE | 152 | 58 | 50.0 | 380,000 | 100,000 | 2 | 500,000 | 0 | 1,000,000 | 0 | NC | NC |
| BENZO(K)FLUORANTHENE | 153 | 70 | 45.0 | 740,000 | 800 | 39 | 56,000 | 2 | 110,000 | 2 | NC | NC |
| CHRYSENE | 154 | 90 | 72.0 | 1,700,000 | 1,000 | 54 | 56,000 | 8 | 110,000 | 5 | NC | NC |
| DIBENZO(A,H)ANTHRACENE | 153 | 35 | 70.0 | 130,000 | 330 | 16 | 560 | 15 | 1,100 | 13 | NC | NC |
| DIBENZOFURAN | 154 | 88 | 52.0 | 1,800,000 | 7,000 | 32 | 350,000 | 4 | 1,000,000 | 2 | NC | NC |
| FLUORANTHENE | 154 | 107 | 51.0 | 5,800,000 | 100,000 | 12 | 500,000 | 4 | 1,000,000 | 3 | NC | NC |
| FLUORENE | 154 | 81 | 46.0 | 2,700,000 | 30,000 | 22 | 500,000 | 3 | 1,000,000 | 2 | 30,000 | 22 |
| HEXACHLOROBENZENE | 154 | 6 | 380 | 13,000 | 330 | 6 | 6,000 | 2 | 12,000 | 1 | NC | NC |
| INDENO(1,2,3-CD)PYRENE | 153 | 60 | 45.0 | 410,000 | 500 | 32 | 5,600 | 12 | 11,000 | 7 | NC | NC |
| NAPHTHALENE | 154 | 116 | 45.0 | 21,000,000 | 12,000 | 54 | 500,000 | 16 | 1,000,000 | 11 | NC | NC |
| PHENANTHRENE | 154 | 107 | 46.0 | 9,300,000 | 100,000 | 19 | 500,000 | 8 | 1,000,000 | 4 | NC | NC |
| PHENOL | 153 | 55 | 42.0 | 360,000 | 330 | 31 | 500,000 | 0 | 1,000,000 | 0 | 30,000 | 1 |
| PYRENE | 154 | 103 | 63.0 | 4,700,000 | 100,000 | 11 | 500,000 | 4 | 1,000,000 | 2 | NC | NC |
| **Pesticides (μg/kg)** | | | | | | | | | | | | |
| 4,4'-DDD | 150 | 11 | 2.00 | 300 | 3.3 | 9 | 92,000 | 0 | 180,000 | 0 | 3.3 | 9 |
| 4,4'-DDE | 150 | 6 | 0.39 | 15.0 | 3.3 | 4 | 62,000 | 0 | 120,000 | 0 | 3.3 | 4 |
| 4,4'-DDT | 150 | 5 | 2.00 | 30.0 | 3.3 | 4 | 47,000 | 0 | 94,000 | 0 | 3.3 | 4 |
| ALDRIN | 150 | 3 | 11.0 | 130 | 5 | 3 | 680 | 0 | 1,400 | 0 | 140 | 0 |
| DELTA-BHC | 150 | 1 | 120 | 120 | 40 | 1 | 500,000 | 0 | 1,000,000 | 0 | 40 | 1 |
| DIELDRIN | 150 | 2 | 17.0 | 28.0 | 5 | 2 | 1,400 | 0 | 2,800 | 0 | 6 | 2 |
| HEXACHLOROBENZENE | 2 | 2 | 19.0 | 1,100 | 330 | 1 | 6,000 | 0 | 12,000 | 0 | NC | NC |
| **PCBs (μg/kg)** | | | | | | | | | | | | |
| AROCLOR-1016 | 154 | 1 | 300 | 300 | 100 | 1 | 1,000 | 0 | 25,000 | 0 | 1,000 | 0 |
| AROCLOR-1242 | 154 | 6 | 35.0 | 3,000 | 100 | 4 | 1,000 | 2 | 25,000 | 0 | 1,000 | 2 |
| AROCLOR-1248 | 154 | 3 | 130 | 884 | 100 | 3 | 1,000 | 0 | 25,000 | 0 | 1,000 | 0 |
| AROCLOR-1254 | 154 | 10 | 40.0 | 6,000 | 100 | 6 | 1,000 | 3 | 25,000 | 0 | 1,000 | 3 |
| AROCLOR-1260 | 154 | 35 | 7.00 | 4,000 | 100 | 16 | 1,000 | 3 | 25,000 | 0 | 1,000 | 3 |
| AROCLOR-1268 | 147 | 1 | 6590 | 6,590 | 100 | 1 | 1,000 | 1 | 25,000 | 0 | 1,000 | 1 |
| **Metals (mg/kg)** | | | | | | | | | | | | |
| ARSENIC | 148 | 125 | 0.42 | 103 | 13 | 22 | 16 | 18 | 16 | 18 | 13 | 22 |
| BARIUM | 152 | 152 | 4.80 | 1,700 | 350 | 18 | 400 | 17 | 10,000 | 0 | 433 | 16 |
| CADMIUM | 152 | 61 | 0.06 | 96.1 | 2.5 | 9 | 9.3 | 4 | 60 | 3 | 4 | 4 |
| CHROMIUM | 152 | 152 | 1.70 | 306 | 30 | 12 | 1,500 | 0 | 6,800 | 0 | 41 | 8 |
| COPPER | 152 | 149 | 1.20 | 629 | 50 | 37 | 270 | 3 | 10,000 | 0 | 50 | 37 |
| CYANIDE | 152 | 46 | 0.74 | 33.0 | 27 | 2 | 27 | 2 | 10,000 | 0 | NC | NC |
| LEAD | 152 | 144 | 0.67 | 1,600 | 63 | 29 | 1,000 | 2 | 3,900 | 0 | 63 | 29 |
| MANGANESE | 152 | 152 | 111 | 2,000 | 1,600 | 3 | 10,000 | 0 | 10,000 | 0 | 1,600 | 3 |
| MERCURY | 154 | 88 | 0.006 | 97.0 | 0.18 | 61 | 2.8 | 31 | 5.7 | 21 | 0.18 | 61 |
| NICKEL | 152 | 141 | 1.90 | 98.6 | 30 | 14 | 310 | 0 | 10,000 | 0 | 30 | 14 |
| SELENIUM | 147 | 102 | 0.31 | 8.30 | 3.9 | 3 | 1,500 | 0 | 6,800 | 0 | 3.9 | 3 |
| SILVER | 152 | 24 | 0.10 | 102 | 2 | 3 | 1,500 | 0 | 6,800 | 0 | 2 | 3 |
| ZINC | 152 | 147 | 6.10 | 2,310 | 109 | 21 | 10,000 | 0 | 10,000 | 0 | 109 | 21 |

**NOTES**

This table presents (1) RI Report data only, (2) the detected concentration data only and (3) only parameters that exceeded the Part 375 Unrestricted, Restricted-Commercial, Restricted-Industrial or Restricted-Protection of Ecological SCOs.

NC = No criteria available

| Table 3<br>Wastebed B-Harbor Brook Site<br>Shallow and Intermediate Groundwater<br>Summary of Detected Concentrations and Class GA SGV and EPA MCL Exceedances | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | Number of Samples | Number of Detects | Minimum Detected Conc. | Maximum Detected Conc. | NYSDEC Class GA SGVs | Number of Class GA Exceedances | EPA National Primary Drinking Water MCLs | Number of MCL Exceedances |
| **Volatile Organic Compounds (μg/L)** | | | | | | | | |
| 1,2,4-TRICHLOROBENZENE | 46 | 2 | 68.0 | 468 | 5(S) | 2 | 70 | 1 |
| 1,2-DICHLOROBENZENE | 36 | 10 | 0.19 | 7,560 | 3(S) | 7 | 600 | 2 |
| 1,3-DICHLOROBENZENE | 37 | 2 | 3.60 | 10.0 | 3(S) | 2 | NC | NC |
| 1,4-DICHLOROBENZENE | 36 | 14 | 0.11 | 8,700 | 3(S) | 8 | 75 | 2 |
| 1,1,1-TRICHLOROETHANE | 100 | 4 | 6.00 | 32.0 | 5(S) | 4 | 200 | 0 |
| 2-BUTANONE | 98 | 21 | 2.00 | 100 | 50(G) | 2 | NC | NC |
| ACETONE | 98 | 41 | 1.16 | 560 | 50(S) | 17 | NC | NC |
| BENZENE | 100 | 64 | 0.30 | 3,900 | 1(S) | 57 | 5 | 49 |
| CARBON DISULFIDE | 79 | 9 | 0.11 | 200 | 60(G) | 1 | NC | NC |
| CHLOROBENZENE | 99 | 20 | 0.11 | 3,080 | 5(S) | 17 | 100 | 11 |
| CHLOROETHANE | 97 | 6 | 0.30 | 6.30 | 5(S) | 1 | NC | NC |
| CHLOROFORM | 100 | 8 | 0.13 | 27.0 | 7(S) | 2 | NC | NC |
| ETHYLBENZENE | 101 | 47 | 0.11 | 540 | 5(S) | 29 | 700 | 0 |
| HEXACHLOROBUTADIENE | 20 | 1 | 1.00 | 1.00 | 0.5(S) | 1 | NC | NC |
| ISOPROPYLBENZENE | 44 | 8 | 0.10 | 68.0 | 5(G) | 3 | NC | NC |
| METHYLENE CHLORIDE | 100 | 2 | 5.50 | 25.0 | 5(S) | 2 | NC | NC |
| NAPHTHALENE | 14 | 10 | 1.00 | 23,000 | 10(G) | 7 | NC | NC |
| STYRENE | 99 | 29 | 0.30 | 1,500 | 5(S) | 22 | 100 | 19 |
| TOLUENE | 99 | 62 | 0.17 | 5,740 | 5(S) | 41 | 1,000 | 14 |
| VINYL CHLORIDE | 100 | 5 | 0.70 | 4.10 | 2(S) | 3 | 2 | 3 |
| XYLENES, TOTAL | 95 | 60 | 0.20 | 4,800 | 5(S) | 46 | 10,000 | 0 |
| **Semivolatile Organic Compounds (μg/L)** | | | | | | | | |
| 1,2,4-TRICHLOROBENZENE | 74 | 5 | 26.0 | 260 | 5(S) | 5 | 70 | 3 |
| 1,2-DICHLOROBENZENE | 74 | 12 | 5.00 | 4,200 | 3(S) | 12 | 600 | 7 |
| 1,3-DICHLOROBENZENE | 73 | 4 | 8.40 | 62.0 | 3(S) | 4 | NC | NC |
| 1,4-DICHLOROBENZENE | 74 | 16 | 0.96 | 4,500 | 3(S) | 12 | 75 | 7 |
| 2,4,5-TRICHLOROPHENOL | 97 | 2 | 2.00 | 7.00 | 1(S) | 2 | NC | NC |
| 2,4-DICHLOROPHENOL | 97 | 8 | 7.00 | 75.0 | 1(S) | 8 | NC | NC |
| 2,4-DIMETHYLPHENOL | 97 | 39 | 1.00 | 7,500 | 50(G) | 28 | NC | NC |
| 2-CHLOROPHENOL | 97 | 1 | 2.00 | 2.00 | 1(S) | 1 | NC | NC |
| 2-METHYLPHENOL | 97 | 40 | 1.20 | 8,000 | 1(S) | 40 | NC | NC |
| 2-NITROPHENOL | 97 | 2 | 2.60 | 3.00 | 1(S) | 2 | NC | NC |
| 4-METHYLPHENOL | 98 | 17 | 1.80 | 12,000 | 1(S) | 17 | NC | NC |
| 4-NITROPHENOL | 98 | 4 | 1.40 | 18.0 | 1(S) | 4 | NC | NC |
| ACENAPHTHENE | 99 | 47 | 1.00 | 2,200 | 20(G) | 21 | NC | NC |
| ANTHRACENE | 99 | 20 | 1.20 | 2,000 | 50(G) | 5 | NC | NC |
| BENZO(A)ANTHRACENE | 99 | 9 | 1.00 | 690 | 0.002(G) | 9 | NC | NC |
| BENZO(B)FLUORANTHENE | 99 | 6 | 1.30 | 240 | 0.002(G) | 6 | NC | NC |
| BENZO(K)FLUORANTHENE | 98 | 4 | 1.20 | 340 | 0.002(G) | 4 | NC | NC |
| BIS(2-ETHYLHEXYL)PHTHALATE | 98 | 39 | 1.00 | 110 | 5(S) | 22 | 6 | 21 |
| CHRYSENE | 99 | 10 | 1.00 | 590 | 0.002(G) | 10 | NC | NC |
| FLUORANTHENE | 99 | 28 | 0.97 | 3,200 | 50(G) | 6 | NC | NC |
| FLUORENE | 99 | 46 | 1.00 | 4,200 | 50(G) | 13 | NC | NC |
| INDENO(1,2,3-CD)PYRENE | 98 | 3 | 1.60 | 110 | 0.002(G) | 3 | NC | NC |
| NAPHTHALENE | 94 | 72 | 1.00 | 35,000 | 10(G) | 62 | NC | NC |
| NITROBENZENE | 98 | 1 | 2.60 | 2.60 | 0.4(S) | 1 | NC | NC |
| PHENANTHRENE | 99 | 47 | 0.70 | 8,300 | 50(G) | 12 | NC | NC |
| PHENOL | 97 | 70 | 1.00 | 18,000 | 1(S) | 69 | NC | NC |
| PYRENE | 99 | 24 | 1.10 | 1,900 | 50(G) | 6 | NC | NC |
| **Pesticides (μg/L)** | | | | | | | | |
| 4,4'-DDD | 93 | 4 | 0.02 | 2.20 | 0.3(S) | 1 | NC | NC |
| 4,4'-DDT | 93 | 1 | 20.0 | 20.0 | 0.2(S) | 1 | NC | NC |
| ALPHA-BHC | 93 | 1 | 0.17 | 0.17 | 0.01(S) | 1 | NC | NC |
| **PCBs (μg/L)** | | | | | | | | |
| AROCLOR-1254 | 93 | 1 | 0.30 | 0.30 | 0.09(S) | 1 | 0.5 | 0 |
| **Metals (mg/L)** | | | | | | | | |
| ANTIMONY | 99 | 4 | 0.002 | 0.005 | 0.003(G) | 1 | 0.006 | 0 |
| ARSENIC | 99 | 14 | 0.004 | 0.03 | 0.025(S) | 1 | 0.01 | 6 |
| BARIUM | 99 | 94 | 0.002 | 20.3 | 1(S) | 9 | 2 | 7 |
| CADMIUM | 99 | 5 | 0.0007 | 0.01 | 0.005(S) | 1 | 0.005 | 1 |
| CHROMIUM | 97 | 52 | 0.002 | 0.27 | 0.05(S) | 7 | 0.1 | 2 |
| COPPER | 99 | 41 | 0.002 | 1.23 | 0.2(S) | 3 | 1.3 | 0 |

| Parameter | Number of Samples | Number of Detects | Minimum Detected Conc. | Maximum Detected Conc. | NYSDEC Class GA SGVs | Number of Class GA Exceedances | EPA National Primary Drinking Water MCLs | Number of MCL Exceedances |
|---|---|---|---|---|---|---|---|---|
| CYANIDE | 98 | 38 | 0.01 | 0.53 | 0.2(S) | 3 | 0.2 | 3 |
| IRON | 100 | 95 | 0.03 | 43.0 | 0.3(S) | 73 | NC | NC |
| LEAD | 99 | 48 | 0.001 | 0.10 | 0.025(S) | 11 | 0.015 | 17 |
| MAGNESIUM | 99 | 92 | 0.06 | 513 | 35(G) | 28 | NC | NC |
| MANGANESE | 99 | 80 | 0.002 | 5.11 | 0.3(S) | 31 | NC | NC |
| MERCURY | 99 | 35 | 0.00004 | 0.03 | 0.0007(S) | 19 | 0.002 | 13 |
| SODIUM | 99 | 99 | 13.2 | 42500 | 20(S) | 94 | NC | NC |
| THALLIUM | 99 | 2 | 0.006 | 0.09 | 0.0005(G) | 2 | 0.002 | 2 |
| **Inorganics (mg/L)** | | | | | | | | |
| CHLORIDE | 74 | 74 | 8.60 | 64000 | 250 | 52 | NC | NC |
| SULFATE | 74 | 61 | 3.50 | 2910 | 250 | 18 | NC | NC |

**NOTES**

This table presents (1) RI Report data only, (2) the detected concentration data only and (3) only parameters that exceeded the NYSDEC Class GA SGVs or USEPA Drinking Water MCLs.

NC = No criteria available

(S) = Standard; (G) = Guidance Value

TABLE 4.1
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 1 - SITE-WIDE[a]
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Surface Soil (0-2 ft bgs) | Surface Soil | Site-wide Surface Soil | Trespasser | Older Child (Age 12 to <18) | Ingestion | Quantitative | There is potential for trespassers to incidentally ingest soil. |
| | | | | | | Dermal | Quantitative | There is potential for trespassers to have dermal exposure to soil. |
| | | | | | Adult (Age >18) | Ingestion | Quantitative | There is potential for trespassers to incidentally ingest soil. |
| | | | | | | Dermal | Quantitative | There is potential for trespassers to have dermal exposure to soil. |
| | | Air | Ambient Air - Fugitive Dust | Trespasser | Older Child (Age 12 to <18) | Inhalation | Quantitative | There is potential for trespassers to inhale fugitive dusts. |
| | | | | | Adult (Age >18) | Inhalation | Quantitative | There is potential for trespassers to inhale fugitive dusts. |
| | | | Ambient Air -Volatile Emissions | Trespasser | Older Child (Age 12 to <18) | Inhalation | Quantitative | There is potential for trespassers to inhale vapors. |
| | | | | | Adult (Age >18) | Inhalation | Quantitative | There is potential for trespassers to inhale vapors. |
| | Surface and Subsurface Soil (0-10 ft bgs) | Surface and Subsurface Soil | Site-wide Surface and Subsurface Soil | Utility Worker | Adult (Age >18) | Ingestion | Quantitative | Utility workers could incidentally ingest soil to a depth of approximately 10 ft bgs repairing or installing on-site utilities. |
| | | | | | | Dermal | Quantitative | Utility workers could have dermal exposure to soil to a depth of approximately 10 ft bgs repairing or installing on-site utilities. |
| | | Air | Ambient Air - Fugitive Dust | Utility Worker | Adult (Age >18) | Inhalation | Quantitative | Utility workers could inhale dust originating from soil excavations as part of repairing or installing on-site utilities. |
| | | | Ambient Air -Volatile Emissions | Utility Worker | Adult (Age >18) | Inhalation | Quantitative | Utility workers could inhale vapors originating from soil excavations as part of repairing or installing on-site utilities. |
| | Surface Sediment (0-1 ft) | Surface Sediment | Site-wide Surface Sediment | Trespasser | Older Child (Age 12 to <18) | Ingestion | Quantitative | There is potential for trespassers to incidentally ingest surface sediment. |
| | | | | | | Dermal | Quantitative | There is potential for trespassers to have dermal exposure to surface sediment. |
| | | | | | Adult (Age >18) | Ingestion | Quantitative | There is potential for trespassers to incidentally ingest surface sediment. |
| | | | | | | Dermal | Quantitative | There is potential for trespassers to have dermal exposure to surface sediment. |
| | Surface and Subsurface Sediment (0-10 ft)[b] | Surface and Subsurface Sediment | Site-wide Surface and Subsurface Sediment | Utility Worker | Adult (Age >18) | Ingestion | Quantitative | Utility workers could incidentally ingest sediment during excavations as part activities related to on-site utilities. |
| | | | | | | Dermal | Quantitative | Utility workers could have dermal exposure to sediment during excavations as part of activities related to on-site utilities. |
| | Surface Water | Surface Water | Site-wide Surface Water | Trespasser | Older Child (Age 12 to <18) | Dermal | Quantitative | Trespasser could have dermal exposure to surface water. |
| | | | | | Adult (Age >18) | Dermal | Quantitative | Trespasser could have dermal exposure to surface water. |
| | | | | Utility Worker | Adult (Age >18) | Dermal | Quantitative | Utility workers could have dermal exposure to surface water during excavations as part of activities related to on-site utilities. |

TABLE 4.1
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 1 - SITE-WIDE[a]
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future (cont'd) | Onondaga Lake Fish Tissue[c] | Fish Tissue | Onondaga Lake Fish Tissue | Trespasser[d] | Older Child (Age 12 to <18) | Ingestion | Quantitative | Trespasser could ingest fish if recreational angling is practiced unlawfully. |
| | | | | | Adult (Age >18) | Ingestion | Quantitative | Trespasser could ingest fish if recreational angling is practiced unlawfully. |
| | Shallow Ground Water (0-10 ft bgs) | Shallow Ground Water | Site-wide Shallow Ground Water | Utility Worker | Adult (Age >18) | Ingestion | None | Incidental ingestion of shallow ground water present during excavations as part of repairing or installing on-site utilities is expected to be *de minimis*. |
| | | | | | | Dermal | Quantitative | Utility workers could have dermal exposure to shallow ground water present during excavations as part of repairing or installing on-site utilities. |
| Future | Surface and Subsurface Soil (0-10 ft bgs) | Surface and Subsurface Soil | Site-wide Surface and Subsurface Soil | Construction Worker | Adult (Age >18) | Ingestion | Quantitative | Future construction workers could incidentally ingest soil to a depth of approximately 10 ft bgs as part of construction projects. |
| | | | | | | Dermal | Quantitative | Future construction workers could have dermal exposure to soil to a depth of approximately 10 ft bgs as part of construction projects. |
| | | Air | Ambient Air - Fugitive Dust | Construction Worker | Adult (Age >18) | Inhalation | Quantitative | Future construction workers could inhale dust originating from soil excavations as part of construction projects. |
| | | | Ambient Air -Volatile Emissions | Construction Worker | Adult (Age >18) | Inhalation | Quantitative | Future construction workers could inhale vapors originating from soil excavations as part of construction projects. |
| | Surface and Subsurface Sediment (0-1 ft)[b] | Surface and Subsurface Sediment | Site-wide Surface and Subsurface Sediment | Construction Worker | Adult (Age >18) | Ingestion | Quantitative | Construction workers could incidentally ingest sediment while conducting activities. |
| | | | | | Adult (Age >18) | Dermal | Quantitative | Construction workers could have dermal contact with sediment while conducting activities. |
| | Surface Water | Surface Water | Site-wide Surface Water | Construction Worker | Adult (Age >18) | Dermal | Quantitative | Construction workers could have dermal contact with surface water while conducting activities. |
| | Shallow Ground Water (0-10 ft bgs) | Shallow Ground Water | Site-wide Shallow Ground Water | Construction Worker | Adult (Age >18) | Dermal | Quantitative | Future construction workers could have dermal exposure to shallow ground water present during excavations as part of construction projects. |

Notes:

a = Site wide designation does not include State wetland SYW-12 area, which is evaluated seperately in this assessment (see Table 1.9).

b = Where contruction or utility workers have may contact with the sediment of Harbor Brook, a depth interval of 0 - 10 ft bgs is applied. This reflects the potential for contact with deeper sediments for bridge reconstruction, which is anticipated and unique to the Harbor Brook exposure area. In a few instances, sediment samples with start depths of 0 ft and end depths ranging from >1 to 3 ft were also incorporated in the evaluation of surface sediment.

c = Fish tissue collected from Onondaga Lake is used herein, given the lack of available fish tissue data from Harbor Brook but recognizing the hydrologic connection between Harbor Brook and Onondaga Lake.

d = Recreation is not currently allowed; a trespasser is therefore evaluated in current scenario. Trespassing includes the fish ingestion pathway and will therefore be protective of a recreator.

References:

NYSDEC. 2002. Onondaga Lake Human Health Risk Assessment. Division of Environmental Remediation. Albany, New York.

TABLE 4.2
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 2 - HARBOR BROOK, LAKESHORE AREA, EAST FLUME, DSA #1, AND DSA #2
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Surface Soil (0-2 ft bgs)[a] | Surface Soil | EU-2 Surface Soils | Surveillance Worker | Adult (Age >18) | Ingestion | Quantitative | A surveillance worker may incidentally ingest surface soil while performing his/her duties. |
| | | | | | | Dermal | Quantitative | A surveillance worker may have dermal exposure to soil while performing his/her duties. |
| | | Air | Ambient Air - Fugitive Dust | Surveillance Worker | Adult (Age >18) | Inhalation | Quantitative | Surveillance workers could inhale fugitive dust. |
| | | | Ambient Air -Volatile Emissions | Surveillance Worker | Adult (Age >18) | Inhalation | Quantitative | Surveillance workers could inhale vapors originating from soil. |

Notes:

a = Exposure to surface soil is not limited to vehicle paths of travel; soil data from the entire exposure unit is used to evaluate risk to the surveillance worker.

TABLE 4.3
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 3 - INTERSTATE 690 DRAINAGE DITCH
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Surface Water | Storm Water | I-690 Drainage Ditch | Ditch Worker | Adult (Age >18) | Ingestion | None | Incidental ingestion of surface (storm) water is expected to be *de minimis.* |
| | | | | | | Dermal | Quantitative | A drainage ditch worker may be dermally exposed to surface (storm) water while performing his/her duties. |
| | Sediment (0-1 ft bgs) | Sediment | I-690 Drainage Ditch Sediment | Ditch Worker | Adult (Age >18) | Ingestion | Quantitative | A ditch worker may incidentally ingest sediment while performing his/her duties. |
| | | | | | | Dermal | Quantitative | A ditch worker may have dermal exposure to sediment while performing his/her duties. |
| | | Air | Ambient Air -Volatile Emissions | Ditch Worker | Adult (Age >18) | Inhalation | Quantitative | Due to the ephemeral nature of the I-690 drainage ditch, periods of time where sediment is exposed are possible. Inhalation of volatile compounds originating from sediment could occur. |

TABLE 4.4
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 4 - RAILROAD AREA
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Surface Soil (0-2 ft bgs) | Surface Soil | EU-4 Surface Soils | Railroad Worker | Adult (Age >18) | Ingestion | Quantitative | A railroad worker may incidentally ingest soil while performing his/her duties. |
| | | | | | | Dermal | Quantitative | A railroad worker may have dermal exposure to soil while performing his/her duties. |
| | | Air | Ambient Air - Fugitive Dust | Railroad Worker | Adult (Age >18) | Inhalation | Quantitative | A railroad worker could inhale fugitive dust while performing his/her duties. |
| | | | Ambient Air -Volatile Emissions | Railroad Worker | Adult (Age >18) | Inhalation | Quantitative | A railroad worker could inhale vapors while performing his/her duties. |

TABLE 4.5
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 5 - PENN-CAN PROPERTY
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Surface Soil (0-2 ft bgs) | Surface Soil | EU-5 Surface Soils | Commercial/ Industrial Worker | Adult (Age >18) | Ingestion | Quantitative | A commercial/industrial worker may incidentally ingest soil while performing his/her duties. |
| | | | | | | Dermal | Quantitative | A commercial/industrial worker may have dermal exposure to soil while performing his/her duties. |
| | | Air | Ambient Air - Fugitive Dust | Commercial/ Industrial Worker | Adult (Age >18) | Inhalation | Quantitative | A commercial/industrial worker could inhale fugitive dust while performing his/her duties outside. |
| | | | Ambient Air -Volatile Emissions | Commercial/ Industrial Worker | Adult (Age >18) | Inhalation | Quantitative | A commercial/industrial worker could inhale vapors while performing his/her duties outside. |
| | Surface and Subsurface Soil (0-10 ft bgs) | Air | Indoor Air - Vapor Intrusion | Commercial/ Industrial Worker | Adult (Age >18) | Inhalation | Quantitative | Vapors originating from soil VOCs may enter building workspace. When soil vapor data is available, detected constituents are evaluated using the framework presented in USEPA (2004) Developing Indoor Air Decision Matrices for Screening and Interim Actions. |
| | Shallow Ground Water (0-10 ft bgs) | Air | Indoor Air - Vapor Intrusion | Commercial/ Industrial Worker | Adult (Age >18) | Inhalation | Quantitative | Constituents in ground water also have the potenial to migrate to the occupational workspace. When sub-surface soil vapor data is unavailable, ground water data will be screened with respect to USEPA OSWER (2002) ground water to indoor air critieria. |

References:

USEPA. 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Ground Water and Soils (Subsurface Vapor Intrusion Guidance) November 2002 EPA530-D-02-004

USEPA. 2004. Developing Indoor Air Decision Matrices for Screening and Interim Actions. Region II. Final Draft. July.

TABLE 4.6
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 6 - HARBOR BROOK, LAKESHORE AREA, EAST FLUME, DSA #1, DSA #2, AND AOS #1
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Surface Soil (0-2 ft bgs) | Surface Soil | EU-6 Surface Soils | Recreational Visitor | Adult (Age >18) | Ingestion | Quantitative | The potential exists for future recreational visitors to incidentally ingest surface soil. |
| | | | | | | Dermal | Quantitative | The potential exists for future recreational visitors to have dermal contact with surface soil. |
| | | | | | Child (Age 0 to <6) | Ingestion | Quantitative | The potential exists for future recreational visitors to incidentally ingest surface soil. |
| | | | | | | Dermal | Quantitative | The potential exists for future recreational visitors to have dermal contact with surface soil. |
| | | | | Resident | Adult (Age >18) | Ingestion | Quantitative | Although residential use of the Site is not expected, the potential for future residents to incidentally ingest surface soil will be evaluated in the analysis of uncertainty. |
| | | | | | | Dermal | Quantitative | Although residential use of the Site is not expected, the potential for future residents to have dermal contact with surface soil will be evaluated in the analysis of uncertainty. |
| | | | | | Child (Age 0 to <6) | Ingestion | Quantitative | Although residential use of the Site is not expected, the potential for future residents to incidentally ingest surface soil will be evaluated in the analysis of uncertainty. |
| | | | | | | Dermal | Quantitative | Although residential use of the Site is not expected, the potential for future residents to have dermal contact with surface soil will be evaluated in the analysis of uncertainty. |
| | | Air | Ambient Air - Fugitive Dust | Recreational Visitor | Adult (Age >18) | Inhalation | Quantitative | There is potential for a recreational visitor to inhale fugitive dust. |
| | | | | | Child (Age 0 to <6) | Inhalation | Quantitative | There is potential for a recreational visitor to inhale fugitive dust. |
| | | | | Resident | Adult (Age >18) | Inhalation | Quantitative | Residential use of the Site is not expected. Nonetheless, potential inhalation of fugitive dust by a resident will be evaluated in the analysis of uncertainty. |
| | | | | | Child (Age 0 to <6) | Inhalation | Quantitative | Residential use of the Site is not expected. Nonetheless, potential inhalation of fugitive dust by a resident will be evaluated in the analysis of uncertainty. |
| | | | Ambient Air -Volatile Emissions | Recreational Visitor | Adult (Age >18) | Inhalation | Quantitative | There is potential for a recreational visitor to inhale vapors. |
| | | | | | Child (Age 0 to <6) | Inhalation | Quantitative | There is potential for a recreational visitor to inhale vapors. |
| | | | | Resident | Adult (Age >18) | Inhalation | Quantitative | Residential use of the Site is not expected. Nonetheless, potential inhalation of vapors by a resident will be evaluated in the analysis of uncertainty. |
| | | | | | Child (Age 0 to <6) | Inhalation | Quantitative | Residential use of the Site is not expected. Nonetheless, potential inhalation of vapors by a resident will be evaluated in the analysis of uncertainty. |

TABLE 4.6
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 6 - HARBOR BROOK, LAKESHORE AREA, EAST FLUME, DSA #1, DSA #2, AND AOS #1
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future (cont'd) | Surface and Subsurface Soil (0-10 ft bgs) | Air | Indoor Air -Vapor Intrusion | Resident | Adult (Age >18) | Inhalation | Quantitative | Residential use of the Site is not anticpated. However, vapors originating from soil VOCs may enter residential buildings, if they were to exist. When soil data is available, detected constituents are evaluated using the framework presented in USEPA (2004) Developing Indoor Air Decision Matrices for Screening and Interim Actions. |
| | | | | | Child (Age 0 to <6) | Inhalation | Quantitative | Residential use of the Site is not anticpated. However, vapors originating from soil VOCs may enter residential buildings, if they were to exist. When soil data is available, detected constituents are evaluated using the framework presented in USEPA (2004) Developing Indoor Air Decision Matrices for Screening and Interim Actions. |
| | Surface Sediment (0-1 ft bgs) | Surface Sediment | EU-6 Surface Sediment | Recreational Visitor | Adult (Age >18) | Ingestion | Quantitative | The potential exists for future recreational visitors to incidentally ingest surface sediment. |
| | | | | | | Dermal | Quantitative | The potential exists for future recreational visitors to have dermal contact with surface sediment. |
| | | | | | Child (Age 0 to <6) | Ingestion | Quantitative | The potential exists for future recreational visitors to incidentally ingest surface sediment. |
| | | | | | | Dermal | Quantitative | The potential exists for future recreational visitors to have dermal contact with surface sediment. |
| | Surface Water | Surface Water | EU-6 Surface Water | Recreational Visitor | Adult (Age >18) | Ingestion | None | Incidental ingestion of surface water is expected to be *de minimis*. |
| | | | | | | Dermal | Quantitative | The potential exists for future recreational visitors to have dermal contact with surface water. |
| | | | | | Child (Age 0 to <6) | Ingestion | None | Incidental ingestion of surface water is expected to be *de minimis*. |
| | | | | | | Dermal | Quantitative | The potential exists for future recreational visitors to have dermal contact with surface water. |
| | Onondaga Lake Fish Tissue[a] | Fish Tissue | Onondaga Lake Fish Tissue | Recreational Visitor | Adult (Age >18) | Ingestion | Quantitative | The potential exists for future recreational visitors to eat fish caught in surface water bodies adjacent to the Site. |
| | | | | | Child (Age 0 to <6) | Ingestion | Quantitative | The potential exists for future recreational visitors to eat fish caught in surface water bodies adjacent to the Site. |

TABLE 4.6
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 6 - HARBOR BROOK, LAKESHORE AREA, EAST FLUME, DSA #1, DSA #2, AND AOS #1
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future (cont'd) | Shallow Ground Water (0-10 ft bgs) | Air | Indoor Air -Vapor Intrusion | Resident | Adult (Age >18) | Inhalation | Quantitative | Residential use of the Site is not anticpated. However, vapors originating from ground water VOCs may enter residential buildings, if they were to exist. Constituents in ground water also have the potenial to migrate to the occupational workspace. When sub-surface soil vapor data is unavailable, ground water data will be evaluated with respect to USEPA OSWER (2002) ground water to indoor air critieria. |
| | | | | | Child (Age 0 to <6) | Inhalation | Quantitative | Residential use of the Site is not anticpated. However, vapors originating from ground water VOCs may enter residential buildings, if they were to exist. Constituents in ground water also have the potenial to migrate to the occupational workspace. When sub-surface soil vapor data is unavailable, ground water data will be evaluated with respect to USEPA OSWER (2002) ground water to indoor air critieria. |

a = Fish tissue collected from Onondaga Lake is used herein, given the lack of available fish tissue data from Harbor Brook but recognizing the hydrologic connection between Harbor Brook and Onondaga Lake.

References:

USEPA. 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Ground Water and Soils (Subsurface Vapor Intrusion Guidance) November 2002 EPA530-D-02-004

USEPA. 2004. Developing Indoor Air Decision Matrices for Screening and Interim Actions. Region II. Final Draft. July.

NYSDEC. 2002. Onondaga Lake Human Health Risk Assessment. Division of Environmental Remediation. Albany, New York.

TABLE 4.7
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 7 - PENN-CAN PROPERTY, LAKESHORE AREA, DSA #1, DSA #2, AOS #1, AND AOS #2
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Surface Soil (0-2 ft bgs) | Surface Soil | EU-7 Surface Soils | Commercial/Industrial Worker | Adult (Age >18) | Ingestion | Quantitative | A commercial/industrial worker may incidentally ingest soil while performing his/her duties. |
| | | | | | Adult (Age >18) | Dermal | Quantitative | A commercial/industrial worker may have dermal exposure to soil while performing his/her duties. |
| | | Air | Ambient Air - Fugitive Dust | Commercial/Industrial Worker | Adult (Age >18) | Inhalation | Quantitative | A commercial/industrial worker could inhale fugitive dust while performing his/her duties outside. |
| | | | Ambient Air -Volatile Emissions | Commercial/Industrial Worker | Adult (Age >18) | Inhalation | Quantitative | A commercial/industrial worker could inhale vapors while performing his/her duties outside. |
| | Surface and Subsurface Soil (0-10 ft bgs) | Air | Indoor Air - Vapor Intrusion | Commercial/Industrial Worker | Adult (Age >18) | Inhalation | Quantitative | Vapors originating from soil VOCs may enter building workspace. When soil vapor data is available, detected constituents are screened using the framework presented in USEPA (2004) Developing Indoor Air Decision Matrices for Screening and Interim Actions. |
| | Shallow Ground Water (0-10 ft bgs) | Air | Indoor Air - Vapor Intrusion | Commercial/Industrial Worker | Adult (Age >18) | Inhalation | Quantitative | Constituents in ground water also have the potenial to migrate to the occupational workspace. When sub-surface soil vapor data is unavailable, ground water data will be evaluated with respect to USEPA OSWER (2002) ground water to indoor air critieria. |

References:


USEPA. 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Ground Water and Soils (Subsurface Vapor Intrusion Guidance) November 2002 EPA530-D-02-004

USEPA. 2004. Developing Indoor Air Decision Matrices for Screening and Interim Actions. Region II. Final Draft. July.

TABLE 4.8
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 8 - SITE-WIDE GROUND WATER[a]
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Ground Water | Drinking Water | Potable Water Sites | Resident | Child (Age 0 to <6) | Ingestion | Quantitative | This is a hypothetical scenario. The Site is zoned as industrial and is unlikely to be developed as a residential area. However, this pathway is being evaluated because the use designation for this aquifer is as a potable water supply and the Nation Contingency Plan states the ground water must be returned to its most beneficial use. Children may ingest ground water during the course of normal activities such drinking potable water. |
| | | | | | | Dermal | Quantitative | This is a hypothetical scenario. The Site is zoned as industrial and is unlikely to be developed as a residential area. However, this pathway is being evaluated because the use designation for this aquifer is as a potable water supply and the Nation Contingency Plan states the ground water must be returned to its most beneficial use. Children may have dermal contact with ground water during the course of normal activities such as bathing/showering. |
| | | | | | | Inhalation | Quantitative | This is a hypothetical scenario. The Site is zoned as industrial and is unlikely to be developed as a residential area. However, this pathway is being evaluated because the use designation for this aquifer is as a potable water supply and the Nation Contingency Plan states the ground water must be returned to its most beneficial use. Children may inhale vapors originating from potable ground water during bathing/showering. |
| | | | | | Adult (Age >18) | Ingestion | Quantitative | This is a hypothetical scenario. The Site is zoned as industrial and is unlikely to be developed as a residential area. However, this pathway is being evaluated because the use designation for this aquifer is as a potable water supply and the Nation Contingency Plan states the ground water must be returned to its most beneficial use. Adults may ingest ground water during the course of normal activities such drinking potable water. |
| | | | | | | Dermal | Quantitative | This is a hypothetical scenario. The Site is zoned as industrial and is unlikely to be developed as a residential area. However, this pathway is being evaluated because the use designation for this aquifer is as a potable water supply and the Nation Contingency Plan states the ground water must be returned to its most beneficial use. Adults may have dermal contact with potable ground water during the course of normal activities such as bathing/showering. |

TABLE 4.8
SELECTION OF EXPOSURE PATHWAYS
EXPOSURE UNIT 8 - SITE-WIDE GROUND WATER[a]
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future (cont'd) | Ground Water (cont'd) | Drinking Water (cont'd) | Potable Water Sites (cont'd) | Resident (cont'd) | Adult (Age >18) (cont'd) | Inhalation | Quantitative | This is a hypothetical scenario. The Site is zoned as industrial and is unlikely to be developed as a residential area. However, this pathway is being evaluated because the use designation for this aquifer is as a potable water supply and the Nation Contingency Plan states the ground water must be returned to its most beneficial use. Adults may inhale vapors originating from potable ground water during bathing/showering. |
| | | | | Commercial/Industrial Worker | Adult (Age >18) | Ingestion | Quantitative | This is a hypothetical scenario. The Site is zoned as industrial and it is unlikely that ground water will be used as a potable water source. However, this pathway is being evaluated because the use designation for this aquifer is as a potable water supply and the Nation Contingency Plan states the ground water must be returned to its most beneficial use. |

a = Includes SYW-12

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD | | Oral Absorption Efficiency for Dermal (unitless) (1) | Absorbed RfD for Dermal (2) | | Primary Target Organ(s)/Critical Effect(s) (3) | Combined Uncertainty/Modifying Factors | | RfD:Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | | Value | Units | | (Uncertainty) | (Modifying) | Source(s) | Date(s) (MM/DD/YYYY) |
| DIOXINS | | | | | | | | | | | |
| 2,3,7,8-TCDD Equivalent | Chronic | 1.0E-09 | mg/kg-day | 7.0E-01 | 1.0E-09 | mg/kg-day | Developmental effects | 90 | 1 | ATSDR (STSC) | 12/01/1998 |
| METALS | | | | | | | | | | | |
| ALUMINUM | Chronic | 1.0E+00 | mg/kg-day | 1.00E+00 | 1.00E+00 | mg/kg-day | Neutotoxicology | 100 | 1 | PPRTV | 10/23/2006 |
| ANTIMONY | Chronic | 4.0E-04 | mg/kg-day | 1.5E-01 | 6.0E-05 | mg/kg-day | Longevity (M); Blood glucose (E); Cholesterol (E) | 1000 | 1 | IRIS | 02/01/2008 |
| ARSENIC | Chronic | 3.0E-04 | mg/kg-day | 9.5E-01 | 3.0E-04 | mg/kg-day | Hyperpigmentation (In); Vascular (V); PNS (N) | 3 | 1 | IRIS | 02/01/2008 |
| BARIUM | Chronic | 2.0E-01 | mg/kg-day | 7.0E-02 | 1.4E-02 | mg/kg-day | Humans - none observed (O); Rats - Kidney (R) | 3 | 1 | IRIS | 02/01/2008 |
| BERYLLIUM | Chronic | 2.0E-03 | mg/kg-day | 7.0E-03 | 1.4E-05 | mg/kg-day | Small intestinal lesions | 300 | 1 | IRIS | 02/01/2008 |
| CADMIUM | Chronic | 1.0E-03 | mg/kg-day | 2.5E-02 | 2.5E-05 | mg/kg-day | Renal (R); Significant Proteinuria | 10 | 1 | IRIS | 02/01/2008 |
| CHROMIUM[a] | Chronic | 3.0E-03 | mg/kg-day | 2.5E-02 | 7.5E-05 | mg/kg-day | None Reported (O) | 300 | 3 | IRIS (chromium VI as surrogate) | 02/01/2008 |
| COBALT | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| COPPER | Chronic | 4.0E-02 | mg/kg-day | 1.0E+00 | 4.0E-02 | mg/kg-day | Gastrointestinal effects | 1 | 1 | HEAST (STSC) | 06/19/1997 |
| CYANIDE | Chronic | 2.0E-02 | mg/kg-day | 1.0E+00 | 2.0E-02 | mg/kg-day | Weight loss, thyroid effects, myelin degeneration | 100 | 5 | IRIS | 02/01/2008 |
| IRON | Chronic | 7.0E-01 | mg/kg-day | 1.0E+00 | 7.0E-01 | mg/kg-day | Gastrointestinal effects | 2 | 1 | PPRTV | 09/11/2006 |
| LEAD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MANGANESE | Chronic | 1.4E-01 | mg/kg-day | 4.0E-02 | 5.6E-03 | mg/kg-day | CNS (N) | 1 | 1 | IRIS | 02/01/2008 |
| MERCURY | Chronic | 3.0E-04 | mg/kg-day | 7.0E-02 | 2.1E-05 | mg/kg-day | Autoimmune effects | 1000 | 1 | IRIS (mercuric chloride) | 05/01/1995 |
| METHYLMERCURY | Chronic | 1.0E-04 | mg/kg-day | 1.0E+00 | 1.0E-04 | mg/kg-day | Developmental neuropsychological impairment (N) | 10 | 1 | IRIS | 07/07/2001 |
| NICKEL | Chronic | 2.0E-02 | mg/kg-day | 4.0E-02 | 8.0E-04 | mg/kg-day | Decreased body and organ weight (W) | 300 | 1 | IRIS | 02/01/2008 |
| SELENIUM | Chronic | 5.0E-03 | mg/kg-day | 8.0E-01 | 5.0E-03 | mg/kg-day | Clinical selenosis | 3 | 1 | IRIS | 02/01/2008 |
| SILVER | Chronic | 5.0E-03 | mg/kg-day | 4.0E-02 | 2.0E-04 | mg/kg-day | Argyria (In) | 3 | 1 | IRIS | 02/01/2008 |
| THALLIUM | Chronic | 8.0E-05 | mg/kg-day | 1.0E+00 | 8.0E-05 | mg/kg-day | Hematological effects | 3000 | 1 | IRIS (thallium chloride) | 02/01/2008 |
| VANADIUM | Chronic | 9.0E-03 | mg/kg-day | 2.6E-02 | 2.3E-04 | mg/kg-day | Decreased hair cystine | 100 | 1 | IRIS (Vanadium pentoxide as surrogate) | 02/01/2008 |
| ZINC | Chronic | 3.0E-01 | mg/kg-day | 1.0E+00 | 3.0E-01 | mg/kg-day | Decreased ESOD (B) | 3 | 1 | IRIS | 02/01/2008 |
| PCBs | | | | | | | | | | | |
| LESS CHLORINATED[b] | Chronic | 7.0E-05 | mg/kg-day | 9.6E-01 | 7.0E-05 | mg/kg-day | Reduced birth weights (W) | 100 | 1 | IRIS | 02/01/2008 |
| HIGHLY CHLORINATED[c] | Chronic | 2.0E-05 | mg/kg-day | 9.6E-01 | 2.0E-05 | mg/kg-day | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 300 | 1 | IRIS | 02/01/2008 |
| TOTAL PCBs[d] | Chronic | 2.0E-05 | mg/kg-day | 9.6E-01 | 2.0E-05 | mg/kg-day | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 300 | 1 | IRIS | 02/01/2008 |
| PESTICIDES | | | | | | | | | | | |
| 4,4'-DDD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,4'-DDT | Chronic | 5.0E-04 | mg/kg-day | 9.0E-01 | 5.0E-04 | mg/kg-day | Liver lesions (H) | 100 | 1 | IRIS | 02/01/2008 |
| ALDRIN | Chronic | 3.0E-05 | mg/kg-day | 1.0E+00 | 3.0E-05 | mg/kg-day | Liver toxicity (H) | 1000 | 1 | IRIS | 02/01/2008 |
| ALPHA-BHC | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ATRAZINE | Chronic | 3.5E-02 | mg/kg-day | 1.0E+00 | 3.5E-02 | mg/kg-day | Decreased body weight gain (W) | 100 | 1 | IRIS | 02/01/2008 |
| CHLORDANE | Chronic | 5.00E-04 | mg/kg-day | 1.0E+00 | 5.00E-04 | mg/kg-day | Neurotoxicity and hematotoxicity. | 300 | 1 | IRIS | 04/28/2008 |
| DELTA-BHC | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| DIELDRIN | Chronic | 5.0E-05 | mg/kg-day | 1.0E+00 | 5.0E-05 | mg/kg-day | Hepatic (H) | 100 | 1 | IRIS | 02/01/2008 |

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD | | Oral Absorption Efficiency for Dermal (unitless) (1) | Absorbed RfD for Dermal (2) | | Primary Target Organ(s)/Critical Effect(s) (3) | Combined Uncertainty/Modifying Factors | | RfD:Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | | Value | Units | | (Uncertainty) | (Modifying) | Source(s) | Date(s) (MM/DD/YYYY) |
| ENDOSULFAN I | Chronic | 6.0E-03 | mg/kg-day | 1.0E+00 | 6.0E-03 | mg/kg-day | Reduced body weight gain in males and females (W); increased incidence of marked progressive glomerulonephrosis and blood vessel aneurysms in males (B) | 100 | 1 | IRIS (Endosulfan as surrogate) | 02/01/2008 |
| ENDOSULFAN II | Chronic | 6.0E-03 | mg/kg-day | 1.0E+00 | 6.0E-03 | mg/kg-day | Reduced body weight gain in males and females (W); increased incidence of marked progressive glomerulonephrosis and blood vessel aneurysms in males (B) | 100 | 1 | IRIS (Endosulfan as surrogate) | 02/01/2008 |
| ENDOSULFAN SULFATE | Chronic | 6.0E-03 | mg/kg-day | 1.0E+00 | 6.0E-03 | mg/kg-day | Reduced body weight gain in males and females (W); increased incidence of marked progressive glomerulonephrosis and blood vessel aneurysms in males (B) | 100 | 1 | IRIS (Endosulfan as surrogate) | 02/01/2008 |
| ENDRIN ALDEHYDE | Chronic | 3.0E-04 | mg/kg-day | 1.0E+00 | 3.0E-04 | mg/kg-day | Mild histological lesions in liver (H), occasional convulsions | 100 | 1 | IRIS (Endrin as surrogate) | 02/01/2008 |
| ENDRIN KETONE | Chronic | 3.0E-04 | mg/kg-day | 1.0E+00 | 3.0E-04 | mg/kg-day | Mild histological lesions in liver (H), occasional convulsions | 100 | 1 | IRIS (Endrin as surrogate) | 02/01/2008 |
| HEPTACHLOR EPOXIDE | Chronic | 1.3E-05 | mg/kg-day | 1.0E+00 | 1.3E-05 | mg/kg-day | Increased liver-to-body weight ratio in males and females (H) | 1000 | 1 | IRIS | 02/01/2008 |
| TOXAPHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| SVOCs | | | | | | | | | | | |
| 1,1'-BIPHENYL | Chronic | 5.0E-02 | mg/kg-day | 1.0E+00 | 5.0E-02 | mg/kg-day | Kidney Damage (R) | 100 | 10 | IRIS | 02/01/2008 |
| 1-METHYLNAPHTHALENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | Chronic | 4.0E-02 | mg/kg-day | 1.0E+00 | 4.0E-02 | mg/kg-day | Decrease in hemoglobin (B) and possible erythrocyte destruction | 1000 | 1 | IRIS | 02/01/2008 |
| 2,4,6-TRICHLOROPHENOL | Chronic | 1.0E-03 | mg/kg-day | 1.0E+00 | 1.0E-03 | mg/kg-day | No adverse effects observed (O) | 3000 | 1 | PPRTV | 02/21/2007 |
| 2,4-DICHLOROPHENOL | Chronic | 3.0E-03 | mg/kg-day | 1.0E+00 | 3.0E-03 | mg/kg-day | Decreased delayed hypersensitiveity response (O) | 100 | 1 | IRIS | 02/01/2008 |
| 2,4-DIMETHYLPHENOL | Chronic | 2.0E-02 | mg/kg-day | 1.0E+00 | 2.0E-02 | mg/kg-day | Clinical signs (lethargy, prostration, and ataxia) and hematological changes (B) | 3000 | 1 | IRIS | 02/01/2008 |
| 2,4-DINITROPHENOL | Chronic | 2.0E-03 | mg/kg-day | 1.0E+00 | 2.0E-03 | mg/kg-day | Cataract formation | 1000 | 1 | IRIS | 02/01/2008 |
| 2,4-DINITROTOLUENE | Chronic | 2.0E-03 | mg/kg-day | 1.0E+00 | 2.0E-03 | mg/kg-day | Neurotoxicity, Heinz bodies and biliary tract hyperplasia | 100 | 1 | IRIS | 02/01/2008 |
| 2,6-DINITROTOLUENE | Chronic | 1.00E-03 | mg/kg-day | 1.00E+00 | 1.00E-03 | mg/kg-day | Central nervous system and respiratory depression, ataxia | 3000 | 1 | PPRTV | 12/13/2004 |
| 2-CHLOROPHENOL | Chronic | 5.0E-03 | mg/kg-day | 1.0E+00 | 5.0E-03 | mg/kg-day | Reproductive efforts | 1000 | 1 | IRIS | 02/01/2008 |
| 2-METHYLNAPHTHALENE | Chronic | 4.0E-03 | mg/kg-day | 1.0E+00 | 4.0E-03 | mg/kg-day | Pulmonary alveolar proteinosis | 1000 | 1 | IRIS | 02/01/2008 |
| 2-METHYLPHENOL | Chronic | 5.0E-02 | mg/kg-day | 1.0E+00 | 5.0E-02 | mg/kg-day | Decreased body weights and neurotoxicity | 1000 | 1 | IRIS | 02/01/2008 |
| 2-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-NITROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 3&4-METHYLPHENOL | Chronic | 5.0E-02 | mg/kg-day | 1.0E+00 | 5.0E-02 | mg/kg-day | Decreased body weight and neurotoxicity | 1000 | 1 | IRIS (3-methylphenol used) | 02/01/2008 |
| 3,3'-DICHLOROBENZIDINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 3-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,6-DINITRO-2-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-BROMOPHENYL PHENYL ETHER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-CHLORO-3-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-CHLOROPHENYL PHENYL ETHER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-NITROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ACENAPHTHENE | Chronic | 6.0E-02 | mg/kg-day | 1.0E+00 | 6.0E-02 | mg/kg-day | Hepatotoxicity (H) | 3000 | 1 | IRIS | 02/01/2008 |

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD | | Oral Absorption Efficiency for Dermal (unitless) (1) | Absorbed RfD for Dermal (2) | | Primary Target Organ(s)/Critical Effect(s) (3) | Combined Uncertainty/Modifying Factors | | RfD:Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | | Value | Units | | (Uncertainty) | (Modifying) | Source(s) | Date(s) (MM/DD/YYYY) |
| ACENAPHTHYLENE* | Chronic | 3.0E-02 | mg/kg-day | 1.0E+00 | 3.0E-02 | mg/kg-day | Kidney effects (renal tubular pathology, decreased kidney weights) (R) | 3000 | 1 | IRIS (Pyrene used as surrogate) | 02/01/2008 |
| ANTHRACENE | Chronic | 3.0E-01 | mg/kg-day | 1.0E+00 | 3.0E-01 | mg/kg-day | No observed effects (O) | 3000 | 1 | IRIS | 02/01/2008 |
| BENZ(A)ANTHRACENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BENZO(A)PYRENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BENZO(B)FLUORANTHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BENZO(G,H,I)PERYLENE* | Chronic | 3.0E-02 | mg/kg-day | 1.0E+00 | 3.0E-02 | mg/kg-day | Kidney effects (renal tubular pathology, decreased kidney weights) (R) | 3000 | 1 | IRIS (Pyrene used as surrogate) | 02/01/2008 |
| BENZO(K)FLUORANTHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BIS(2-CHLOROETHOXY)METHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BIS(2-CHLOROETHYL)ETHER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BIS(2-ETHYLHEXYL)PHTHALATE | Chronic | 2.0E-02 | mg/kg-day | 1.0E+00 | 2.0E-02 | mg/kg-day | Increased relative liver weight (H) | 1000 | 1 | IRIS | 02/01/2008 |
| CARBAZOLE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CHRYSENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| DIBENZ(A,H)ANTHRACENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| DIBENZOFURAN | Chronic | 1.0E-03 | mg/kg-day | 1.0E+00 | 1.0E-03 | mg/kg-day | Reduced length and organ weight. Excess abdominal fat (O). | 10000 | 1 | PPRTV | 06/11/2007 |
| FLUORANTHENE | Chronic | 4.0E-02 | mg/kg-day | 1.0E+00 | 4.0E-02 | mg/kg-day | Nephropathy, increased liver weights (H), hematological alterations (B), and clinical effects | 3000 | 1 | IRIS | 02/01/2008 |
| FLUORENE | Chronic | 4.0E-02 | mg/kg-day | 1.0E+00 | 4.0E-02 | mg/kg-day | Decreased RBC (B), packed cell volumen and hemoglobin (B) | 3000 | 1 | IRIS | 02/01/2008 |
| HEXACHLOROBENZENE | Chronic | 8.0E-04 | mg/kg-day | 1.0E+00 | 8.0E-04 | mg/kg-day | Hepatic (H) | 100 | 1 | IRIS | 02/01/2008 |
| HEXACHLOROBUTADIENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HEXACHLOROETHANE | Chronic | 1.0E-03 | mg/kg-day | 1.0E+00 | 1.0E-03 | mg/kg-day | Atrophy and degeneration of the renal tubules (R) | 1000 | 1 | IRIS | 02/01/2008 |
| INDENO(1,2,3-CD)PYRENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| NAPHTHALENE | Chronic | 2.0E-02 | mg/kg-day | 8.9E-01 | 2.0E-02 | mg/kg-day | Decreased body weight (W) | 3000 | 1 | IRIS | 02/01/2008 |
| N-HEXADACANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| NITROBENZENE | Chronic | 5.0E-04 | mg/kg-day | 1.0E+00 | 5.0E-04 | mg/kg-day | Hematologic (B), adrenal, renal (R) and hepatic (H) lesions | 10000 | 1 | IRIS | 02/01/2008 |
| N-NITROSO-DI-N-PROPYLAMINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PENTACHLOROPHENOL | Chronic | 3.0E-02 | mg/kg-day | 7.6E-01 | 3.0E-02 | mg/kg-day | Liver (H) and kidney (R) pathology | 100 | 1 | IRIS | 02/01/2008 |
| PHENANTHRENE* | Chronic | 3.0E-02 | mg/kg-day | 1.0E+00 | 3.0E-02 | mg/kg-day | Kidney effects (renal tubular pathology, decreased kidney weights) (R) | 3000 | 1 | IRIS (Pyrene used as surrogate) | 02/01/2008 |
| PHENOL | Chronic | 3.0E-01 | mg/kg-day | 1.0E+00 | 3.0E-01 | mg/kg-day | Decreaed maternal weight gain (W) | 300 | 1 | IRIS | 02/01/2008 |
| PYRENE | Chronic | 3.0E-02 | mg/kg-day | 1.0E+00 | 3.0E-02 | mg/kg-day | Kidney effects (renal tubular pathology, decreased kidney weights) (R) | 3000 | 1 | IRIS | 02/01/2008 |
| VOCs | | | | | | | | | | | |
| 1,1,2,2-TETRACHLOROETHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,1,2-TRICHLOROETHANE | Chronic | 4.0E-03 | mg/kg-day | 1.0E+00 | 4.0E-03 | mg/kg-day | Clinical serum chemistry | 1000 | 1 | IRIS | 02/01/2008 |
| 1,2,3-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2,4-TRICHLOROBENZENE | Chronic | 1.0E-02 | mg/kg-day | 1.0E+00 | 1.0E-02 | mg/kg-day | Increased adrenal weights; vacuolization of zona fasciculata in the cortex | 1000 | 1 | IRIS | 02/01/2008 |
| 1,2,4-TRIMETHYLBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2-DICHLOROBENZENE | Chronic | 9.0E-02 | mg/kg-day | 1.0E+00 | 9.0E-02 | mg/kg-day | No adverse effects observed (O) | 1000 | 1 | IRIS | 02/01/2008 |
| 1,2-DICHLOROETHANE | Chronic | 2.0E-02 | mg/kg-day | NA | NA | NA | Cardiac arrhythmia, bronchitis, central nervous system depression, and injury to the liver, kidneys, and gastrointestinal tract | 3000 | 1 | PPRTV | 10/31/2002 |
| 1,2-DICHLOROPROPANE | Chronic | 9.0E-02 | mg/kg-day | 1.0E+00 | 9.0E-02 | mg/kg-day | Liver (H) | 1000 | 1 | ATSDR (STSC) | 12/01/1989 |
| 1,3,5-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,3,5-TRIMETHYLBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,3-DICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,4-DICHLOROBENZENE | Chronic | 7.0E-02 | mg/kg-day | 1.0E+00 | 7.0E-02 | mg/kg-day | Liver | 100 | 1 | ATSDR (STSC) | 07/01/2006 |

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD | | Oral Absorption Efficiency for Dermal (unitless) (1) | Absorbed RfD for Dermal (2) | | Primary Target Organ(s)/Critical Effect(s) (3) | Combined Uncertainty/Modifying Factors | | RfD:Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | | Value | Units | | (Uncertainty) | (Modifying) | Source(s) | Date(s) (MM/DD/YYYY) |
| 2-HEXANONE | Chronic | 2.0E-01 | mg/kg-day | 1.0E+00 | 2.0E-01 | mg/kg-day | Myofibrillar atrophy of the quadriceps. | 300 | 1 | PPRTV | 02/01/2008 |
| ACETONE | Chronic | 9.0E-01 | mg/kg-day | 1.0E+00 | 9.0E-01 | mg/kg-day | Nephropathy | 1000 | 1 | IRIS | 02/01/2008 |
| BENZENE | Chronic | 4.0E-03 | mg/kg-day | 1.0E+00 | 4.0E-03 | mg/kg-day | Reduced lymphocyte count | 300 | 1 | IRIS | 02/01/2008 |
| BROMODICHLOROMETHANE | Chronic | 2.0E-02 | mg/kg-day | 1.0E+00 | 2.0E-02 | mg/kg-day | Renal cytomegaly (R) | 1000 | 1 | IRIS | 02/01/2008 |
| BROMOMETHANE | Chronic | 1.4E-03 | mg/kg-day | 1.0E+00 | 1.4E-03 | mg/kg-day | Epithelial hyperplasia of the forestomach | 1000 | 1 | IRIS | 02/01/2008 |
| CARBON DISULFIDE | Chronic | 1.0E-01 | mg/kg-day | 1.0E+00 | 1.0E-01 | mg/kg-day | Fetal toxicity/malformations | 100 | 1 | IRIS | 02/01/2008 |
| CARBON TETRACHLORIDE | Chronic | 7.0E-04 | mg/kg-day | 1.0E+00 | 7.0E-04 | mg/kg-day | Liver lesions (H) | 1000 | 1 | IRIS | 02/01/2008 |
| CHLOROBENZENE | Chronic | 2.0E-02 | mg/kg-day | 1.0E+00 | 2.0E-02 | mg/kg-day | Histopathologic changes in liver | 1000 | 1 | IRIS | 02/01/2008 |
| CHLORODIBROMOMETHANE | Chronic | 2.0E-02 | mg/kg-day | 1.0E+00 | 2.0E-02 | mg/kg-day | Hepatic lesions | 1000 | 1 | IRIS | 02/01/2008 |
| CHLOROETHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CHLOROFORM | Chronic | 1.0E-02 | mg/kg-day | 1.0E+00 | 1.0E-02 | | Moderate/marked fatty cyst formation in the liver and elevated SGPT | 1000 | 1 | IRIS | 02/01/2008 |
| CIS-1,3-DICHLOROPROPENE | Chronic | 3.0E-02 | mg/kg-day | 1.0E+00 | 3.0E-02 | mg/kg-day | Chronic irritation | 100 | 1 | IRIS | 02/01/2008 |
| DICHLOROBENZENES | Chronic | 7.0E-02 | mg/kg-day | 1.0E+00 | 7.0E-02 | mg/kg-day | | | | | |
| DODECANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ETHYLBENZENE | Chronic | 1.0E-01 | mg/kg-day | 1.0E+00 | 1.0E-01 | mg/kg-day | Liver (H) and kidney (R) toxicity | 1000 | 1 | IRIS | 02/01/2008 |
| ISOPROPYLBENZENE | Chronic | 1.0E-01 | mg/kg-day | 1.0E+00 | 1.0E-01 | mg/kg-day | Increased average kidney weight in female rats (R) | 1000 | 1 | IRIS | 02/01/2008 |
| METHYLENE CHLORIDE | Chronic | 6.0E-02 | mg/kg-day | 1.0E+00 | 6.0E-02 | mg/kg-day | Liver toxicity (H) | 100 | 1 | IRIS | 02/01/2008 |
| P-ISOPROPYLTOLUENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| SEC-BUTYLBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| STYRENE | Chronic | 2.0E-01 | mg/kg-day | 1.0E+00 | 2.0E-01 | mg/kg-day | Red blood cell (B) and liver effects (H) | 1000 | 1 | IRIS | 02/01/2008 |
| TETRACHLOROETHENE | Chronic | 1.0E-02 | mg/kg-day | 1.0E+00 | 1.0E-02 | mg/kg-day | Hepatotoxicity in mice (H), weight gain in rats | 1000 | 1 | IRIS | 02/01/2008 |
| TOLUENE | Chronic | 8.0E-02 | mg/kg-day | 1.0E+00 | 8.0E-02 | mg/kg-day | Increased kidney weight (R) | 3000 | 1 | IRIS | 02/01/2008 |
| TRANS-1,3-DICHLOROPROPENE | Chronic | 3.0E-02 | mg/kg-day | 1.0E+00 | 3.0E-02 | mg/kg-day | Chronic irritation | 100 | 1 | IRIS (cis-1,3-Dichloropropene as surrogate) | 02/01/2008 |
| TRICHLOROETHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| VINYL CHLORIDE | Chronic | 3.0E-03 | mg/kg-day | 1.0E+00 | 3.0E-03 | mg/kg-day | Liver cell polymorphism (H) | 30 | 1 | IRIS | 02/01/2008 |
| XYLENES, TOTAL | Chronic | 2.0E-01 | mg/kg-day | 1.0E+00 | 2.0E-01 | mg/kg-day | Decreased body weight (W), increased mortality (M) | 1000 | 1 | IRIS | 02/01/2008 |

**Notes:**

(1) Oral Absorption Efficiency from Exhibit 4-1 of USEPA (2004) RAGS Part E. For constituents not listed in Exhibit 4-1, an absorption efficiency of 1 is assumed. For constituents with a range of absorption efficiencies in Exhibit 4-1, the highest value is reported.

(2) For Oral Absorption Efficiency for Dermal < 0.5, Absorbed RfD for Dermal = Oral RfD * Oral Absorption Efficiency for Dermal; otherwise, Absorbed RfD for Dermal = Oral RfD (USEPA 2004 RAGS Part E, Exhibit 4-1).

(3) Codes for Effects Endpoints: B - Hematological/Blood effect; E - Endocrine system effect; GI - Gastrointestinal system; H - Hepatic/Liver effect; I - Immune system effect; In - Integumentary/Skin effect; M - Mortality/Death/Longevity; N - Nervous system effect O - Other effect (e.g., hyperactivity, none reported); OC - Ocular effect; R - Renal/Kidney effect; T - Teratogenic effect; V - Vascular system effect; W - Decreased body weight.

* = For non-carcinogenic PAHs, the proposed surrogate benzo(a)pyrene was applied to estimate Oral Reference Dose (see USEPA 1993) Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, EPA/600/R-93/089).

a = Because chromium was not speciated, the RfC for chromium VI was utilized.

b = Less chlorinated PCBs includes Aroclors 1221, 1232, 1016, and 1242. RfD values for Aroclor-1016 (CAS# 126741120) utilized.

c = Highly Chlorinated PCBs includes Aroclors 1248, 1254, 1260 [and higher if reported]. RfD values for Aroclor-1254 (CAS# 11097691) utilized.

d = Includes all detected Aroclors. RfD values for Aroclor-1254 (CAS# 11097691) utilized.

NA - Not available

**Sources:**

Tier 1 - IRIS - United States Environmental Protection Agency (USEPA) Integrated Risk Information System (Available at: http://www.epa.gov/iris).

Tier 2 - PPRTV - USEPA Provisional Peer Reviewed Toxicity Values from the Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center (STSC).

Tier 3 - Tox values approved by Superfund Technical Support Center. ATSDR - Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs, Available at: http://www.atsdr.cdc.gov/mrls/index.html);
CALEPA - California Environmental Protection Agency toxicity criteria database (Available at: http://www.oehha.ca.gov/risk/chemicalDB//index.asp); HEAST - USEPA Health Effects Assessment Summary Tables from the USEPA STSC;
NCEA - National Center for Environmental Assessment;USEPA (2003). Memo from Southerland. OSWER Directive 9285.7-75. USEPA (1993) Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, EPA/600/R-93/089).

STSC - Indicates that the associated value was provided for this assessment by the Superfund Technical Support Center.

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Chronic/ Subchronic | Inhalation RfC | | Extrapolated RfD (1) | | Primary Target Organ(s) (2) | Combined Uncertainty/Modifying Factors | | RfC : Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | Value | Units | | (Uncertainty) | (Modifying) | Source(s) | Date(s) (MM/DD/YYYY) |
| DIOXINS | | | | | | | | | | |
| 2,3,7,8-TCDD Equivalent | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| METALS | | | | | | | | | | |
| ALUMINUM | Chronic | 5.0E-03 | $mg/m^3$ | 1.4E-03 | mg/kg-day | Psychomotor and cognative impairments | 300 | 1 | PPRTV | 10/23/2006 |
| ANTIMONY | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ARSENIC | Chronic | 5.0E-05 | mg/m3 | 1.4E-05 | mg/kg-day | Development, cardiovascular, nervious system | NA | NA | CalEPA (STSC) | 02/04/2008 |
| BARIUM | Chronic | 5.0E-04 | mg/m3 | 1.4E-04 | mg/kg-day | Renal toxicity | NA | NA | HEAST (STSC) | 1995 |
| BERYLLIUM | Chronic | 2.0E-05 | $mg/m^3$ | 5.7E-06 | mg/kg-day | Beryllium sensitization and progression to chronic beryllium disease | 10 | 1 | IRIS | 02/04/2008 |
| CADMIUM | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CHROMIUM[a] | Chronic | 1.0E-04 | $mg/m^3$ | 2.9E-05 | mg/kg-day | Respiratory (P) | 300 | 1 | IRIS (Chromium VI particulates as surrogate) | 02/04/2008 |
| COBALT | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| COPPER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CYANIDE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| IRON | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| LEAD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MANGANESE | Chronic | 5.0E-05 | $mg/m^3$ | 1.4E-05 | mg/kg-day | Neurobehavioral changes (N, O) | 1000 | 1 | IRIS | 02/04/2008 |
| MERCURY | Chronic | 3.0E-04 | $mg/m^3$ | 8.6E-05 | mg/kg-day | PNS (N); CNS (N) | 30 | 1 | IRIS | 02/04/2008 |
| METHYLMERCURY | Chronic | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| NICKEL | Chronic | 9.0E-05 | $mg/m^3$ | 2.6E-05 | mg/kg-day | Respiratory (P) | 3.00E+01 | 1 | ATSDR (ATSC) | 09/01/2005 |
| SELENIUM | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| SILVER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| THALLIUM | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| VANADIUM | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ZINC | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PCBs | | | | | | | | | | |
| LESS CHLORINATED[b] | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HIGHLY CHLORINATED[c] | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| TOTAL PCBs[d] | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PESTICIDES | | | | | | | | | | |
| 4,4'-DDD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,4'-DDT | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ALDRIN | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ALPHA-BHC | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ATRAZINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CHLORDANE | Chronic | 7.0E-04 | mg/m3 | 2.0E-04 | mg/m3 | Neurotoxicity and hematoxicity. | 1000 | 1 | IRIS | 4/28/2008 |
| DELTA-BHC | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| DIELDRIN | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ENDOSULFAN I | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ENDOSULFAN II | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Chronic/ Subchronic | Inhalation RfC | | Extrapolated RfD (1) | | Primary Target Organ(s) (2) | Combined Uncertainty/Modifying Factors | | RfC : Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | Value | Units | | (Uncertainty) | (Modifying) | Source(s) | Date(s) (MM/DD/YYYY) |
| ENDOSULFAN SULFATE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ENDRIN ALDEHYDE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ENDRIN KETONE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HEPTACHLOR EPOXIDE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| TOXAPHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| SVOCs | | | | | | | | | | |
| 1,1'-BIPHENYL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1-METHYLNAPHTHALENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4,6-TRICHLOROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DICHLOROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DIMETHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DINITROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DINITROTOLUENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,6-DINITROTOLUENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-CHLOROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-METHYLNAPHTHALENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-NITROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 3&4-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 3,3'-DICHLOROBENZIDINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 3-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,6-DINITRO-2-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-BROMOPHENYL PHENYL ETHER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-CHLORO-3-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-CHLOROPHENYL PHENYL ETHER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-NITROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ACENAPHTHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ACENAPHTHYLENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ANTHRACENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BENZ(A)ANTHRACENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BENZO(A)PYRENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BENZO(B)FLUORANTHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BENZO(G,H,I)PERYLENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BENZO(K)FLUORANTHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BIS(2-CHLOROETHOXY)METHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BIS(2-CHLOROETHYL)ETHER | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BIS(2-ETHYLHEXYL)PHTHALATE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CARBAZOLE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Chronic/ Subchronic | Inhalation RfC | | Extrapolated RfD (1) | | Primary Target Organ(s) (2) | Combined Uncertainty/Modifying Factors | | RfC : Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | Value | Units | | (Uncertainty) | (Modifying) | Source(s) | Date(s) (MM/DD/YYYY) |
| CHRYSENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| DIBENZ(A,H)ANTHRACENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| DIBENZOFURAN | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| FLUORANTHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| FLUORENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HEXACHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HEXACHLOROBUTADIENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HEXACHLOROETHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| INDENO(1,2,3-CD)PYRENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| NAPHTHALENE | Chronic | 3.0E-03 | $mg/m^3$ | 8.6E-04 | mg/kg-day | Nasal/respiratory (P) | 3000 | 1 | IRIS | 02/04/2008 |
| N-HEXADACANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| NITROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| N-NITROSO-DI-N-PROPYLAMINE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PENTACHLOROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PHENANTHRENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| PHENOL | Chronic | 2.0E-01 | $mg/m^3$ | 5.7E-02 | mg/kg-day | Alimentary, cardiovascular, kidney, nervous system | NA | NA | CalEPA (STSC) | 02/04/2008 |
| PYRENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| VOCs | | | | | | | | | | |
| 1,1,2,2-TETRACHLOROETHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,1,2-TRICHLOROETHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2,3-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2,4-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2,4-TRIMETHYLBENZENE | Chronic | 7.0E-03 | $mg/m^3$ | 2.0E-03 | mg/kg-day | Hematological and Pulmonary | 3000 | 1 | PPRTV | 06/11/2007 |
| 1,2-DICHLOROBENZENE | Chronic | 0.14 | $mg/m^3$ | 4.0E-02 | mg/kg-day | NA | NA | NA | HEAST (STSC) | 1997 |
| 1,2-DICHLOROETHANE | Chronic | 2.4E+00 | $mg/m^3$ | 6.9E-01 | mg/kg-day | Hepatic effects | 90 | 1 | ATSDR (STSC) | 09/01/2001 |
| 1,2-DICHLOROPROPANE | Chronic | 4.0E-03 | $mg/m^3$ | 1.1E-03 | mg/kg-day | Nasal | 300 | 1 | IRIS | 02/04/2008 |
| 1,3,5-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,3,5-TRIMETHYLBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,3-DICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,4-DICHLOROBENZENE | Chronic | 8.0E-01 | $mg/m^3$ | 2.3E-01 | mg/kg-day | Liver | 100 | 1 | IRIS | 02/04/2008 |
| 2-HEXANONE | Chronic | 2.0E-01 | mg/m3 | 5.7E-02 | mg/kg-day | Peripheral neuropathy | 1000 | 1 | IRIS | 04/28/2008 |
| ACETONE | Chronic | 3.1E+00 | mg/m3 | 8.6E+00 | mg/kg-day | Neurological effects | 100 | 1 | ATSDR (STSC) | 05/01/1994 |
| BENZENE | Chronic | 3.0E-02 | $mg/m^3$ | 8.6E-03 | mg/kg-day | Decreased lymphocyte count | 300 | 1 | IRIS | 02/04/2008 |
| BROMODICHLOROMETHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| BROMOMETHANE | Chronic | 5.0E-03 | $mg/m^3$ | 1.4E-03 | mg/kg-day | Nasal lesions and membrane degeneration | 100 | 1 | IRIS | 02/04/2008 |
| CARBON DISULFIDE | Chronic | 7.0E-01 | $mg/m^3$ | 2.0E-01 | mg/kg-day | Peripheral nervous system dysfunction | 30 | 1 | IRIS | 02/04/2008 |
| CARBON TETRACHLORIDE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CHLORODIBROMOMETHANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| CHLOROETHANE | Chronic | 1.0E+01 | $mg/m^3$ | 2.8E+00 | mg/kg-day | Delayed fetal ossification | 300 | 1 | IRIS | 02/04/2008 |

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Chronic/ Subchronic | Inhalation RfC | | Extrapolated RfD (1) | | Primary Target Organ(s) (2) | Combined Uncertainty/Modifying Factors | | RfC : Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | Value | Units | | (Uncertainty) | (Modifying) | Source(s) | Date(s) (MM/DD/YYYY) |
| CHLOROFORM | Chronic | 9.8E-02 | $mg/m^3$ | 2.8E-02 | mg/kg-day | Hepatic effects | 100 | 1 | ATSDR (STSC) | 09/01/1997 |
| CIS-1,3-DICHLOROPROPENE | Chronic | 2.0E-02 | $mg/m^3$ | 5.7E-03 | mg/kg-day | Nasal epethlium hypertrophy/hyperplasia | 30 | 1 | IRIS | 02/04/2008 |
| DICHLOROBENZENES | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| DODECANE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| ETHYLBENZENE | Chronic | 1.0E+00 | $mg/m^3$ | 2.9E-01 | mg/kg-day | Developmental toxicity | 300 | 1 | IRIS | 02/04/2008 |
| ISOPROPYLBENZENE | Chronic | 4.0E-01 | $mg/m^3$ | 1.10E-01 | mg/kg-day | Increased kidney and adrenal weights | 1000 | 1 | IRIS | 02/04/2008 |
| METHYLENE CHLORIDE | Chronic | 1.04E+00 | $mg/m^3$ | 3.0E-01 | mg/kg-day | Hepatic effects | 30 | 1 | ATSDR (STSC) | 2007 |
| P-ISOPROPYLTOLUENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| SEC-BUTYLBENZENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| STYRENE | Chronic | 1.0E+01 | $mg/m^3$ | 2.9E+00 | mg/kg-day | Central nervous system effects | 30 | 1 | IRIS | 02/04/2008 |
| TETRACHLOROETHENE | Chronic | 2.7E-01 | $mg/m^3$ | 7.6E-02 | mg/kg-day | Neurological effects | 100 | 1 | ATSDR (STSC) | 9/1/2007 |
| TOLUENE | Chronic | 5.0E+00 | $mg/m^3$ | 1.4E+00 | mg/kg-day | Neurological effects | 10 | 1 | IRIS | 02/04/2008 |
| TRANS-1,3-DICHLOROPROPENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| TRICHLOROETHENE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| VINYL CHLORIDE | Chronic | 1.1E-01 | $mg/m^3$ | 3.1E-02 | mg/kg-day | Liver cell polymorphism | 30 | 1 | IRIS | 02/04/2008 |
| XYLENES, TOTAL | Chronic | 1.0E-01 | $mg/m^3$ | 2.9E-02 | mg/kg-day | Impaired motor coordination (decreased rotarod performance) | 300 | 1 | IRIS | 02/04/2008 |

**Notes:**

(1) Extrapolated RfD = Inhalation RfC / (70 kg / 20 $m^3$); USEPA (1989) RAGS Part A.

(2) Codes for Effects Endpoints: B - Hematological/Blood effect; E - Endocrine system effect; GI - Gastrointestinal system; H - Hepatic/Liver effect; I - Immune system effect; In - Integumentary/Skin effect; M - Mortality/Death/Longevity; N - Nervous system effect; O - Other effect (e.g., hyperactivity, none reported); OC - Ocular effect; R - Renal/Kidney effect; T - Teratogenic effect; V - Vascular system effect; W - Decreased body weight.

a = Because chromium was not speciated, RfC and RfD values for chromium VI were utilized.

b = Less chlorinated PCBs includes Aroclors 1221, 1232, 1016, and 1242. RfD values for Aroclor-1016 (CAS# 126741120) utilized.

c = Highly Chlorinated PCBs includes Aroclors 1248, 1254, 1260 [and higher if reported]. RfD values for Aroclor-1254 (CAS# 11097691) utilized.

d = Includes all detected Aroclors. RfD values for Aroclor-1254 (CAS# 11097691) utilized.

NA - Not available.

**Sources:**

Tier 1 - IRIS - United States Environmental Protection Agency (USEPA) Integrated Risk Information System (Available at: http://www.epa.gov/iris).

Tier 2 - PPRTV - USEPA Provisional Peer Reviewed Toxicity Values from the Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center (STSC).

Tier 3 - Tox values approved by Superfund Technical Support Center. ATSDR - Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs, Available at: http://www.atsdr.cdc.gov/mrls/index.html); CALEPA - California Environmental Protection Agency toxicity criteria database (Available at: http://www.oehha.ca.gov/risk/chemicalDB//index.asp); HEAST - USEPA Health Effects Assessment Summary Tables from the USEPA STSC; NCEA - National Center for Environmental Assessment;USEPA (2003). Memo from Southerland. OSWER Directive 9285.7-75. USEPA (1993) Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, EPA/600/R-93/089).

STSC - Indicates that the associated value was provided for this assessment by the Superfund Technical Support Center.

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Oral Cancer Slope Factor | | Oral Absorption Efficiency for Dermal (Unitless) (1) | Absorbed Cancer Slope Factor for Dermal (2) | | Weight of Evidence/ Cancer Guideline Description (3) | Oral CSF | |
|---|---|---|---|---|---|---|---|---|
| | Value | Units | | Value | Units | | Source(s) | Date(s) (MM/DD/YYYY) |
| DIOXINS | | | | | | | | |
| 2,3,7,8-TCDD Equivalent** | 1.5E+05 | $(mg/kg\text{-}day)^{-1}$ | 7.0E-01 | 1.5E+05 | $(mg/kg\text{-}day)^{-1}$ | B2 | HEAST | 1997 |
| METALS | | | | | | | | |
| ALUMINUM | NA | NA | NA | NA | NA | NA | NA | NA |
| ANTIMONY | NA | NA | NA | NA | NA | NA | NA | NA |
| ARSENIC | 1.5E+00 | $(mg/kg\text{-}day)^{-1}$ | 9.5E-01 | 1.5E+00 | $(mg/kg\text{-}day)^{-1}$ | A | IRIS | 02/04/2008 |
| BARIUM | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| BERYLLIUM | NA | NA | NA | NA | NA | B1 | IRIS | 02/04/2008 |
| CADMIUM | NA | NA | NA | NA | NA | B1 | IRIS | 02/04/2008 |
| CHROMIUM[a] | NA | NA | NA | NA | NA | A | IRIS (Chromium VI as surrogate) | 02/04/2008 |
| COBALT | NA | NA | NA | NA | NA | NA | NA | NA |
| COPPER | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| CYANIDE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| IRON | NA | NA | NA | NA | NA | NA | NA | NA |
| LEAD | NA | NA | NA | NA | NA | B2 | IRIS | 04/29/2008 |
| MANGANESE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| MERCURY | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| METHYLMERCURY | NA | NA | NA | NA | NA | C | IRIS | 02/04/2008 |
| NICKEL | NA | NA | NA | NA | NA | NA | NA | NA |
| SELENIUM | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| SILVER | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| THALLIUM | NA | NA | NA | NA | NA | D | IRIS (thallium chloride) | 02/04/2008 |
| VANADIUM | NA | NA | NA | NA | NA | NA | NA | NA |
| ZINC | NA | NA | NA | NA | NA | NA | NA | NA |
| PCBs | | | | | | | | |
| LESS CHLORINATED[b] | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | 9.6E-01 | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | No IRIS eval., used upper bound PCBs (B2) | IRIS | 02/04/2008 |
| HIGHLY CHLORINATED[c] | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | 9.6E-01 | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | No IRIS eval., used upper bound PCBs (B2) | IRIS | 02/04/2008 |
| TOTAL PCBs[d] | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | 9.6E-01 | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | No IRIS eval., used upper bound PCBs (B2) | IRIS | 02/04/2008 |
| PESTICIDES | | | | | | | | |
| 4,4'-DDD | 2.4E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 2.4E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| 4,4'-DDT | 3.4E-01 | $(mg/kg\text{-}day)^{-1}$ | 9.0E-01 | 3.4E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| ALDRIN | 1.7E+01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.7E+01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| ALPHA-BHC | 6.3E+00 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 6.3E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| ATRAZINE | NA | NA | NA | NA | NA | NA | NA | NA |
| CHLORDANE | 3.5E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 3.5E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 04/29/2008 |
| DELTA-BHC | NA | NA | NA | NA | NA | B2 | IRIS | 02/04/2008 |
| DIELDRIN | 1.6E+01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.6E+01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| ENDOSULFAN I | NA | NA | NA | NA | NA | NA | NA | NA |
| ENDOSULFAN II | NA | NA | NA | NA | NA | NA | NA | NA |
| ENDOSULFAN SULFATE | NA | NA | NA | NA | NA | NA | NA | NA |

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Oral Cancer Slope Factor | | Oral Absorption Efficiency for Dermal (Unitless) (1) | Absorbed Cancer Slope Factor for Dermal (2) | | Weight of Evidence/ Cancer Guideline Description (3) | Oral CSF | |
|---|---|---|---|---|---|---|---|---|
| | Value | Units | | Value | Units | | Source(s) | Date(s) (MM/DD/YYYY) |
| ENDRIN ALDEHYDE | NA | NA | NA | NA | NA | NA | NA | NA |
| ENDRIN KETONE | NA | NA | NA | NA | NA | NA | NA | NA |
| HEPTACHLOR EPOXIDE | 9.1E+00 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 9.1E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| TOXAPHENE | 1.1E+00 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.1E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| SVOCs | | | | | | | | |
| 1,1'-BIPHENYL | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| 1-METHYLNAPHTHALENE | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4,6-TRICHLOROPHENOL | 1.1E-02 | $(mg/kg\text{-}day)^{-1}$ | 7.0E-01 | 1.1E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| 2,4-DICHLOROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DIMETHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DINITROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DINITROTOLUENE | 6.8E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 6.8E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS (2,4-/2,6-Dinitrotoluene Mixture as surrogate) | 02/04/2008 |
| 2,6-DINITROTOLUENE | 6.8E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 6.8E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS (2,4-/2,6-Dinitrotoluene Mixture as surrogate) | 02/04/2008 |
| 2-CHLOROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-METHYLNAPHTHALENE | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-METHYLPHENOL | NA | NA | NA | NA | NA | C | IRIS | 02/04/2008 |
| 2-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA |
| 2-NITROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA |
| 3&4-METHYLPHENOL | NA | NA | NA | NA | NA | C | IRIS (3-methylphenol used as surrogate) | 02/04/2008 |
| 3,3'-DICHLOROBENZIDINE | 4.5E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 4.5E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| 3-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA |
| 4,6-DINITRO-2-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-BROMOPHENYL PHENYL ETHER | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| 4-CHLORO-3-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-CHLOROPHENYL PHENYL ETHER | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-METHYLPHENOL | NA | NA | NA | NA | NA | C | IRIS | 02/04/2008 |
| 4-NITROANILINE | NA | NA | NA | NA | NA | NA | NA | NA |
| 4-NITROPHENOL | NA | NA | NA | NA | NA | NA | NA | NA |
| ACENAPHTHENE | NA | NA | NA | NA | NA | NA | NA | NA |
| ACENAPHTHYLENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| ANTHRACENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| BENZ(A)ANTHRACENE* | 7.3E-01 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-01 | 7.3E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | USEPA 1993 (STSC) | 06/01/2003 |
| BENZO(A)PYRENE* | 7.3E+00 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-01 | 7.3E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| BENZO(B)FLUORANTHENE* | 7.3E-01 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-01 | 7.3E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | USEPA 1993 (STSC) | 06/01/2003 |
| BENZO(G,H,I)PERYLENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| BENZO(K)FLUORANTHENE* | 7.3E-02 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-01 | 7.3E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | USEPA 1993 (STSC) | 06/01/2003 |
| BIS(2-CHLOROETHOXY)METHANE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| BIS(2-CHLOROETHYL)ETHER | 1.1E+00 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.1E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| BIS(2-ETHYLHEXYL)PHTHALATE | 1.4E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.4E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Oral Cancer Slope Factor | | Oral Absorption Efficiency for Dermal (Unitless) (1) | Absorbed Cancer Slope Factor for Dermal (2) | | Weight of Evidence/ Cancer Guideline Description (3) | Oral CSF | |
|---|---|---|---|---|---|---|---|---|
| | Value | Units | | Value | Units | | Source(s) | Date(s) (MM/DD/YYYY) |
| CARBAZOLE | NA | NA | NA | NA | NA | NA | NA | NA |
| CHRYSENE* | 7.3E-03 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-01 | 7.3E-03 | $(mg/kg\text{-}day)^{-1}$ | B2 | USEPA 1993 (STSC) | 06/01/2003 |
| DIBENZ(A,H)ANTHRACENE* | 7.3E+00 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-01 | 7.3E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | USEPA 1993 (STSC) | 06/01/2003 |
| DIBENZOFURAN | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| FLUORANTHENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| FLUORENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| HEXACHLOROBENZENE | 1.6E+00 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.6E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| HEXACHLOROBUTADIENE | 7.8E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 7.8E-02 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/04/2008 |
| HEXACHLOROETHANE | 1.4E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.4E-02 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/04/2008 |
| INDENO(1,2,3-CD)PYRENE* | 7.3E-01 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-01 | 7.3E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | USEPA 1993 (STSC) | 06/01/2003 |
| NAPHTHALENE | NA | NA | NA | NA | NA | C | IRIS | 02/04/2008 |
| N-HEXADACANE | NA | NA | NA | NA | NA | NA | NA | NA |
| NITROBENZENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| N-NITROSO-DI-N-PROPYLAMINE | 7.0E+00 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 7.0E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| PENTACHLOROPHENOL | 1.2E-01 | $(mg/kg\text{-}day)^{-1}$ | 7.6E-01 | 1.2E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| PHENANTHRENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| PHENOL | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| PYRENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| VOC | | | | | | | | |
| 1,1,2,2-TETRACHLOROETHANE | 2.0E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 2.0E-01 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/04/2008 |
| 1,1,2-TRICHLOROETHANE | 5.7E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 5.7E-02 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/04/2008 |
| 1,2,3-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2,4-TRICHLOROBENZENE | 3.6E-03 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 3.6E-03 | $(mg/kg\text{-}day)^{-1}$ | D | CalEPA (STSC) | 04/29/2008 |
| 1,2,4-TRIMETHYLBENZENE | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,2-DICHLOROBENZENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| 1,2-DICHLOROETHANE | 9.1E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 9.1E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| 1,2-DICHLOROPROPANE | 3.60E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 3.60E-02 | $(mg/kg\text{-}day)^{-1}$ | NA | CalEPA (STSC) | 04/29/2008 |
| 1,3,5-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,3,5-TRIMETHYLBENZENE | NA | NA | NA | NA | NA | NA | NA | NA |
| 1,3-DICHLOROBENZENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| 1,4-DICHLOROBENZENE | 5.40E-03 | $(mg/kg\text{-}day)^{-1}$ | 1.00E+00 | 5.40E-03 | $(mg/kg\text{-}day)^{-1}$ | B2 | CalEPA (STSC) | 04/29/2008 |
| 2-HEXANONE | NA | NA | NA | NA | NA | NA | NA | NA |
| ACETONE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| BENZENE | 5.5E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 5.5E-02 | $(mg/kg\text{-}day)^{-1}$ | A | IRIS | 02/04/2008 |
| BROMODICHLOROMETHANE | 6.2E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 6.2E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| BROMOMETHANE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| CARBON DISULFIDE | NA | NA | NA | NA | NA | NA | NA | NA |
| CARBON TETRACHLORIDE | 1.3E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.3E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| CHLOROBENZENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| CHLORODIBROMOMETHANE | 8.4E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 8.4E-02 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/04/2008 |
| CHLOROETHANE | NA | NA | NA | NA | NA | NA | NA | NA |
| CHLOROFORM | NA | NA | NA | NA | NA | B2 | IRIS | 02/04/2008 |
| CIS-1,3-DICHLOROPROPENE | 5.0E-02 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 5.0E-02 | $(mg/kg\text{-}day)^{-1}$ | NA | NA | NA |

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Oral Cancer Slope Factor | | Oral Absorption Efficiency for Dermal (Unitless) (1) | Absorbed Cancer Slope Factor for Dermal (2) | | Weight of Evidence/ Cancer Guideline Description (3) | Oral CSF | |
|---|---|---|---|---|---|---|---|---|
| | Value | Units | | Value | Units | | Source(s) | Date(s) (MM/DD/YYYY) |
| DICHLOROBENZENES | NA | NA | NA | NA | NA | NA | NA | NA |
| DODECANE | NA | NA | NA | NA | NA | NA | NA | NA |
| ETHYLBENZENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| ISOPROPYLBENZENE | NA | NA | NA | NA | NA | D | IRIS | 02/04/2008 |
| METHYLENE CHLORIDE | 7.5E-03 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 7.5E-03 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/04/2008 |
| P-ISOPROPYLTOLUENE | NA | NA | NA | NA | NA | NA | NA | NA |
| SEC-BUTYLBENZENE | NA | NA | NA | NA | NA | NA | NA | NA |
| STYRENE | NA | NA | NA | NA | NA | NA | NA | NA |
| TETRACHLOROETHENE | 5.4E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 5.4E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | USEPA 2003 (STSC) | 06/01/2003 |
| TOLUENE | NA | NA | NA | NA | NA | NA | NA | NA |
| TRANS-1,3-DICHLOROPROPENE | NA | NA | NA | NA | NA | NA | NA | NA |
| TRICHLOROETHENE | 4.0E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 4.0E-01 | $(mg/kg\text{-}day)^{-1}$ | A2 | NCEA (STSC) | 01/01/2001 |
| VINYL CHLORIDE[e] | 1.5E+00 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 1.5E+00 | $(mg/kg\text{-}day)^{-1}$ | A | IRIS | 02/04/2008 |
| VINYL CHLORIDE[f] | 7.5E-01 | $(mg/kg\text{-}day)^{-1}$ | 1.0E+00 | 7.5E-01 | $(mg/kg\text{-}day)^{-1}$ | A | IRIS | 02/04/2008 |
| XYLENES, TOTAL | NA | NA | NA | NA | NA | NA | NA | NA |

**Notes:**

(1) Oral Absorption Efficiency from Exhibit 4-1 of USEPA (2004) RAGS Part E. For constituents not listed in Exhibit 4-1, an absorption efficiency of 1 is assumed. For constituents with a range of absorption efficiencies in Exhibit 4-1, the highest value is reported.

(2) For Oral Absorption Efficiency for Dermal < 0.5, Absorbed Cancer Slope Factor for Dermal = Oral Cancer Slope Factor / Oral Absorption Efficiency for Dermal; otherwise, Absorbed Cancer Slope Factor for Dermal = Oral Cancer Slope Factor (USEPA 2004 RAGS Part E, Exhibit 4-1).

(3) Codes for Weight of Evidence: A - Human Carcinogen; B - Probable Human Carcinogen; C - Possible Human Carcinogen; D - Not Classifiable as to Human Carcinogenicity; E - Evidence of Non-Carcinogenicity in Humans.

* = For carcinogenic PAHs, relative potency approach with respect to benzo(a)pyrene applied to estimate Oral Cancer Slope Factor (see Table L-5 and USEPA 1993 Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, EPA/600/R-93/089).

a = Because chromium was not speciated, the CSF for chromium VI was utilized.

b = Less chlorinated includes Aroclors 1221, 1232, 1016, and 1242. RfD values for Aroclor-1016 (CAS# 126741120) utilized.

c = Hightly Chlorinated includes Aroclors 1248, 1254, 1260 [and higher if reported]. RfD values for Aroclor-1254 (CAS# 11097691) utilized.

d = Includes all detected Aroclors. RfD values for Aroclor-1254 (CAS# 11097691) utilized.

e = Cancer slope factor/unit risk for continuous exposure to Vinyl Chloride from birth. To be used in calculation of risk to receptors <18 years of age only.

f = Cancer slope factor/unit risk for continuous exposure to Vinyl Chloride from adulthood. To be used in calculation of risk to receptors >18 years of age only.

NA - Not available

**Sources:**

Tier 1 - IRIS - United States Environmental Protection Agency (USEPA) Integrated Risk Information System (Available at: http://www.epa.gov/iris).

Tier 2 - PPRTV - USEPA Provisional Peer Reviewed Toxicity Values from the Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center (STSC).

Tier 3 - Tox values approved by Superfund Technical Support Center. ATSDR - Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs, Available at: http://www.atsdr.cdc.gov/mrls/index.html); CALEPA - California Environmental Protection Agency toxicity criteria database (Available at: http://www.oehha.ca.gov/risk/chemicalDB//index.asp); HEAST - USEPA Health Effects Assessment Summary Tables from the USEPA STSC; NCEA - National Center for Environmental Assessment;USEPA (2003). Memo from Southerland. OSWER Directive 9285.7-75. USEPA (1993) Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, EPA/600/R-93/089).

STSC - Indicates that the associated value was provided for this assessment by the Superfund Technical Support Center.

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Inhalation Unit Risk | | Inhalation Cancer Slope Factor (1) | | Weight of Evidence/ Cancer Guideline Description (2) | Unit Risk : Inhalation CSF | |
|---|---|---|---|---|---|---|---|
| | Value | Units | Value | Units | | Source(s) | Date(s) (MM/DD/YYYY) |
| DIOXIN | | | | | | | |
| 2,3,7,8-TCDD Equivalent | NA | NA | NA | NA | NA | NA | NA |
| METALS | | | | | | | |
| ALUMINUM | NA | NA | NA | NA | NA | NA | NA |
| ANTIMONY | NA | NA | NA | NA | NA | NA | NA |
| ARSENIC | 4.3E+00 | $(mg/m^3)^{-1}$ | 1.5E+01 | $(mg/kg\text{-}day)^{-1}$ | A | IRIS | 02/05/2008 |
| BARIUM | NA | NA | NA | NA | D | IRIS | 04/29/2008 |
| BERYLLIUM | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| CADMIUM | 1.8E+00 | $(mg/m^3)^{-1}$ | 6.3E+00 | $(mg/kg\text{-}day)^{-1}$ | B1 | IRIS | 02/05/2008 |
| CHROMIUM[a] | 1.2E+01 | $(mg/m^3)^{-1}$ | 4.2E+01 | $(mg/kg\text{-}day)^{-1}$ | A (Chromium VI used as surrogate) | IRIS | 02/05/2008 |
| COBALT | NA | NA | NA | NA | NA | NA | NA |
| COPPER | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| CYANIDE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| IRON | NA | NA | NA | NA | NA | NA | NA |
| LEAD | NA | NA | NA | NA | B2 (IRIS): The agent is possibly carcinogenic to humans | IRIS | 11/01/1993 |
| MANGANESE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| MERCURY | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| METHYLMERCURY | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| NICKEL | 2.6E-01 | $(mg/m^3)^{-1}$ | 9.1E-01 | $(mg/kg\text{-}day)^{-1}$ | A | CalEPA (STSC) | 04/29/2008 |
| SELENIUM | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| SILVER | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| THALLIUM | NA | NA | NA | NA | D (thallium chloride) | IRIS | 02/05/2008 |
| VANADIUM | NA | NA | NA | NA | NA | NA | NA |
| ZINC | NA | NA | NA | NA | NA | NA | NA |
| PCBs | | | | | | | |
| LESS CHLORINATED[c] | 1.0E-01 | $(mg/m^3)^{-1}$ | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | No IRIS eval., used upper bound PCBs (B2) | IRIS | 02/05/2008 |
| HIGHLY CHLORINATED[d] | 1.0E-01 | $(mg/m^3)^{-1}$ | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | No IRIS eval., used upper bound PCBs (B2) | IRIS | 02/05/2008 |
| TOTAL PCBs[b] | 1.0E-01 | $(mg/m^3)^{-1}$ | 2.0E+00 | $(mg/kg\text{-}day)^{-1}$ | No IRIS eval., used upper bound PCBs (B2) | IRIS | 02/05/2008 |
| PESTICIDES | | | | | | | |
| 4,4'-DDD | NA | NA | NA | NA | B2 | IRIS | 02/05/2008 |
| 4,4'-DDT | 9.7E-02 | $(mg/m^3)^{-1}$ | 3.4E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| ALDRIN | 4.9E+00 | $(mg/m^3)^{-1}$ | 1.7E+01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| ALPHA-BHC | 1.8E+00 | $(mg/m^3)^{-1}$ | 6.3E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| ATRAZINE | NA | NA | NA | NA | NA | NA | NA |
| CHLORDANE | 1.0E-01 | $(mg/m^3)^{-1}$ | 3.5E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 04/29/2008 |
| DELTA-BHC | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| DIELDRIN | 4.6E+00 | $(mg/m^3)^{-1}$ | 1.6E+01 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| ENDOSULFAN I | NA | NA | NA | NA | NA | NA | NA |
| ENDOSULFAN II | NA | NA | NA | NA | NA | NA | NA |
| ENDOSULFAN SULFATE | NA | NA | NA | NA | NA | NA | NA |

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Inhalation Unit Risk | | Inhalation Cancer Slope Factor (1) | | Weight of Evidence/ Cancer Guideline Description (2) | Unit Risk : Inhalation CSF | |
|---|---|---|---|---|---|---|---|
| | Value | Units | Value | Units | | Source(s) | Date(s) (MM/DD/YYYY) |
| ENDRIN ALDEHYDE | NA | NA | NA | NA | NA | NA | NA |
| ENDRIN KETONE | NA | NA | NA | NA | NA | NA | NA |
| HEPTACHLOR EPOXIDE | 2.6E+00 | $(mg/m^3)^{-1}$ | 9.1E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| TOXAPHENE | 3.2E-01 | $(mg/m^3)^{-1}$ | 1.1E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| SVOC | | | | | | | |
| 1,1'-BIPHENYL | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| 1-METHYLNAPHTHALENE | NA | NA | NA | NA | NA | NA | NA |
| 2,2'-OXYBIS(1-CHLOROPROPANE) | NA | NA | NA | NA | NA | NA | NA |
| 2,4,6-TRICHLOROPHENOL | 3.1E-03 | $(mg/m^3)^{-1}$ | 1.1E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| 2,4-DICHLOROPHENOL | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DIMETHYLPHENOL | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DINITROPHENOL | NA | NA | NA | NA | NA | NA | NA |
| 2,4-DINITROTOLUENE | NA | NA | NA | NA | NA | NA | NA |
| 2,6-DINITROTOLUENE | NA | NA | NA | NA | B2 | IRIS | 02/05/2008 |
| 2-CHLOROPHENOL | NA | NA | NA | NA | NA | NA | NA |
| 2-METHYLNAPHTHALENE | NA | NA | NA | NA | NA | NA | NA |
| 2-METHYLPHENOL | NA | NA | NA | NA | C | IRIS | 02/05/2008 |
| 2-NITROANILINE | NA | NA | NA | NA | NA | NA | NA |
| 2-NITROPHENOL | NA | NA | NA | NA | NA | NA | NA |
| 3&4-METHYLPHENOL | NA | NA | NA | NA | C | IRIS (3-methylphenol used as surrogate) | 02/05/2008 |
| 3,3'-DICHLOROBENZIDINE | 3.0E-01 | $(mg/m^3)^{-1}$ | 1.1E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | CalEPA (STSC) | 04/29/2008 |
| 3-NITROANILINE | NA | NA | NA | NA | NA | NA | NA |
| 4,6-DINITRO-2-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA |
| 4-BROMOPHENYL PHENYL ETHER | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| 4-CHLORO-3-METHYLPHENOL | NA | NA | NA | NA | NA | NA | NA |
| 4-CHLOROPHENYL PHENYL ETHER | NA | NA | NA | NA | NA | NA | NA |
| 4-METHYLPHENOL | NA | NA | NA | NA | C | IRIS | 02/05/2008 |
| 4-NITROANILINE | NA | NA | NA | NA | NA | NA | NA |
| 4-NITROPHENOL | NA | NA | NA | NA | NA | NA | NA |
| ACENAPHTHENE | NA | NA | NA | NA | NA | NA | NA |
| ACENAPHTHYLENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| ANTHRACENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| BENZ(A)ANTHRACENE | NA | NA | NA | NA | B2 | IRIS | 03/01/1994 |
| BENZO(A)PYRENE | NA | NA | NA | NA | B2 | IRIS | 07/01/1992 |
| BENZO(B)FLUORANTHENE | NA | NA | NA | NA | B2 | IRIS | 03/01/1994 |
| BENZO(G,H,I)PERYLENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| BENZO(K)FLUORANTHENE | NA | NA | NA | NA | B2 | IRIS | 03/01/1994 |
| BIS(2-CHLOROETHOXY)METHANE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| BIS(2-CHLOROETHYL)ETHER | 3.3E-01 | $(mg/m^3)^{-1}$ | 1.2E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| BIS(2-ETHYLHEXYL)PHTHALATE | NA | NA | NA | NA | B2 | IRIS | 02/05/2008 |

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Inhalation Unit Risk | | Inhalation Cancer Slope Factor (1) | | Weight of Evidence/ Cancer Guideline Description (2) | Unit Risk : Inhalation CSF | |
|---|---|---|---|---|---|---|---|
| | Value | Units | Value | Units | | Source(s) | Date(s) (MM/DD/YYYY) |
| CARBAZOLE | NA | NA | NA | NA | NA | NA | NA |
| CHRYSENE | NA | NA | NA | NA | B2 | NA | 03/01/1994 |
| DIBENZ(A,H)ANTHRACENE | NA | NA | NA | NA | B2 | IRIS | 03/01/1994 |
| DIBENZOFURAN | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| FLUORANTHENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| FLUORENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| HEXACHLOROBENZENE | 4.6E-01 | $(mg/m^3)^{-1}$ | 1.6E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| HEXACHLOROBUTADIENE | 2.2E-02 | $(mg/m^3)^{-1}$ | 7.7E-02 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/05/2008 |
| HEXACHLOROETHANE | 4.0E-03 | $(mg/m^3)^{-1}$ | 1.4E-02 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/05/2008 |
| INDENO(1,2,3-CD)PYRENE | NA | NA | NA | NA | B2 | IRIS | 03/01/1994 |
| NAPHTHALENE | 3.4E-02 | $(mg/m^3)^{-1}$ | 1.2E-01 | $(mg/kg\text{-}day)^{-1}$ | C | CalEPA (STSC) | 04/29/2008 |
| N-HEXADACANE | NA | NA | NA | NA | NA | NA | NA |
| NITROBENZENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| N-NITROSO-DI-N-PROPYLAMINE | 2.0E+00 | $(mg/m^3)^{-1}$ | 7.0E+00 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| PENTACHLOROPHENOL | 4.6E-03 | $(mg/m^3)^{-1}$ | 1.6E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| PHENANTHRENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| PHENOL | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| PYRENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| VOC | | | | | | | |
| 1,1,2,2-TETRACHLOROETHANE | 5.8E-02 | $(mg/m^3)^{-1}$ | 2.0E-01 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/05/2008 |
| 1,1,2-TRICHLOROETHANE | 1.6E-02 | $(mg/m^3)^{-1}$ | 5.6E-02 | $(mg/kg\text{-}day)^{-1}$ | C | IRIS | 02/05/2008 |
| 1,2,3-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA |
| 1,2,4-TRICHLOROBENZENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| 1,2,4-TRIMETHYLBENZENE | NA | NA | NA | NA | NA | NA | NA |
| 1,2-DICHLOROBENZENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| 1,2-DICHLOROETHANE | 2.6E-02 | $(mg/m^3)^{-1}$ | 9.1E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| 1,2-DICHLOROPROPANE | 1.0E-02 | $(mg/m^3)^{-1}$ | 3.6E-02 | $(mg/kg\text{-}day)^{-1}$ | NA | CalEPA (STSC) | 04/29/2008 |
| 1,3,5-TRICHLOROBENZENE | NA | NA | NA | NA | NA | NA | NA |
| 1,3,5-TRIMETHYLBENZENE | NA | NA | NA | NA | NA | NA | NA |
| 1,3-DICHLOROBENZENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| 1,4-DICHLOROBENZENE | 1.1E-02 | $(mg/m^3)^{-1}$ | 4.0E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | CalEPA (STSC) | 04/29/2008 |
| 2-HEXANONE | NA | NA | NA | NA | NA | NA | NA |
| ACETONE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| BENZENE | 7.8E-03 | $(mg/m^3)^{-1}$ | 2.7E-02 | $(mg/kg\text{-}day)^{-1}$ | A | IRIS | 02/05/2008 |
| BROMODICHLOROMETHANE | 3.7E-02 | $(mg/m^3)^{-1}$ | 1.3E-01 | $(mg/kg\text{-}day)^{-1}$ | B2 | CalEPA (STSC) | 04/29/2008 |
| BROMOMETHANE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| CARBON DISULFIDE | NA | NA | NA | NA | NA | NA | NA |
| CARBON TETRACHLORIDE | 1.5E-02 | $(mg/m^3)^{-1}$ | 5.3E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| CHLOROBENZENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| CHLORODIBROMOMETHANE | NA | NA | NA | NA | C | IRIS | 02/05/2008 |
| CHLOROETHANE | NA | NA | NA | NA | NA | NA | NA |
| CHLOROFORM | 2.3E-02 | $(mg/m^3)^{-1}$ | 8.1E-02 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| CIS-1,3-DICHLOROPROPENE | NA | NA | NA | NA | NA | NA | NA |

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
HONEYWELL, WASTEBED B/HARBOR BROOK SITE, GEDDES AND SYRACUSE, NEW YORK

| Chemical of Potential Concern | Inhalation Unit Risk | | Inhalation Cancer Slope Factor (1) | | Weight of Evidence/ Cancer Guideline Description (2) | Unit Risk : Inhalation CSF | |
|---|---|---|---|---|---|---|---|
| | Value | Units | Value | Units | | Source(s) | Date(s) (MM/DD/YYYY) |
| DICHLOROBENZENES | NA | NA | NA | NA | NA | NA | 02/05/2008 |
| DODECANE | NA | NA | NA | NA | NA | NA | NA |
| ETHYLBENZENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| ISOPROPYLBENZENE | NA | NA | NA | NA | D | IRIS | 02/05/2008 |
| METHYLENE CHLORIDE | 4.7E-04 | $(mg/m^3)^{-1}$ | 1.7E-03 | $(mg/kg\text{-}day)^{-1}$ | B2 | IRIS | 02/05/2008 |
| P-ISOPROPYLTOLUENE | NA | NA | NA | NA | NA | NA | NA |
| SEC-BUTYLBENZENE | NA | NA | NA | NA | NA | NA | NA |
| STYRENE | NA | NA | NA | NA | NA | NA | NA |
| TETRACHLOROETHENE | 5.9E-06 | $(mg/m^3)^{-1}$ | 2.1E-05 | $(mg/kg\text{-}day)^{-1}$ | B2 | USEPA 2003 (STSC) | 6/12/2003 |
| TOLUENE | NA | NA | NA | NA | NA | NA | NA |
| TRANS-1,3-DICHLOROPROPENE | NA | NA | NA | NA | NA | NA | NA |
| TRICHLOROETHENE | 1.1E-01 | $(mg/m^3)^{-1}$ | 4.0E-01 | $(mg/kg\text{-}day)^{-1}$ | A2 | NCEA (STSC) | 01/01/2001 |
| VINYL CHLORIDE[e] | 8.8E-03 | $(mg/m^3)^{-1}$ | 3.1E-02 | $(mg/kg\text{-}day)^{-1}$ | A | IRIS | 02/05/2008 |
| VINYL CHLORIDE[f] | 4.4E-03 | $(mg/m^3)^{-1}$ | 1.5E-02 | $(mg/kg\text{-}day)^{-1}$ | A | IRIS | 02/05/2008 |
| XYLENES, TOTAL | NA | NA | NA | NA | NA | NA | NA |

**Notes:**
(1) Inhalation Cancer Slope Factor = Inhalation Unit Risk * (70 kg / 20 $m^3$); USEPA (1989) RAGS Part A.
efficiencies in Exhibit 4-1, the highest value is reported.
(2) Codes for Weight of Evidence: A - Human Carcinogen; B - Probable Human Carcinogen; C - Possible Human Carcinogen; D - Not Classifiable as to Human Carcinogenicity;
E - Evidence of Non-Carcinogenicity in Humans.
a = Because chromium was not speciated, the inhalation unit risk value for chromium VI was utilized
b = Includes all detected Aroclors. RfD values for Aroclor-1254 (CAS# 11097691) utilized.
c = Less chlorinated includes Aroclors 1221, 1232, 1016, and 1242. RfD values for Aroclor-1016 (CAS# 126741120) utilized.
d = Hightly Chlorinated includes Aroclors 1248, 1254, 1260 [and higher if reported]. RfD values for Aroclor-1254 (CAS# 11097691) utilized.
e = Cancer slope factor/unit risk for continuous exposure to Vinyl Chloride from birth. To be used in calculation of risk to receptors <18 years of age only.
f = Cancer slope factor/unit risk for continuous exposure to Vinyl Chloride from adulthood. To be used in calculation of risk to receptors >18 years of age only.
NA - Not available
**Sources:**
Tier 1 - IRIS - United States Environmental Protection Agency (USEPA) Integrated Risk Information System (Available at: http://www.epa.gov/iris).
Tier 2 - PPRTV - USEPA Provisional Peer Reviewed Toxicity Values from the Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center.
Tier 3 - Tox values approved by Superfund Technical Support Center. ATSDR - Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs, Available at: http://www.atsdr.cdc.gov/mrls/index.html);
CALEPA - California Environmental Protection Agency toxicity criteria database (Available at: http://www.oehha.ca.gov/risk/chemicalDB//index.asp); HEAST - USEPA Health Effects Assessment Summary Tables from the USEPA STSC;
NCEA - National Center for Environmental Assessment;USEPA (2003). Memo from Southerland. OSWER Directive 9285.7-75. USEPA (1993) Provisional Guidance for Quantitative Risk Assessment of
Polycyclic Aromatic Hydrocarbons, EPA/600/R-93/089).
STSC - Indicates that the associated value was provided for this assessment by the Superfund Technical Support Center.

TABLE 7.1 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Trespasser |
| Receptor Age: | Older Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Onondaga Lake Fish Tissue | Fish Tissue | Exposure Unit 1 | 2,3,7,8-TCDD Equivalent | 8E-05 | -- | -- | 8E-05 | Developmental effects | 6E+00 | -- | -- | 6E+00 |
| | | | ARSENIC | 3E-06 | -- | -- | 3E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 8E-02 | -- | -- | 8E-02 |
| | | | MERCURY (AS METHYLMERCURY | -- | -- | -- | -- | Developmental neuropsychological impairment (N) | 3E+00 | -- | -- | 3E+00 |
| | | | HIGHLY CHLORINATED PCBs | 3E-05 | -- | -- | 3E-05 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 9E+00 | -- | -- | 9E+00 |
| | | | LESS CHLORINATED PCBs | 2E-05 | -- | -- | 2E-05 | Reduced birth weights (W) | 2E+00 | -- | -- | 2E+00 |
| | | | ALDRIN | 1E-06 | -- | -- | 1E-06 | Liver toxicity (H) | 2E-02 | -- | -- | 2E-02 |
| | | | DIELDRIN | 2E-06 | -- | -- | 2E-06 | Hepatic (H) | 2E-02 | -- | -- | 2E-02 |
| | | | Chemical Total | 1E-04 | -- | -- | 1E-04 | | 2E+01 | -- | -- | 2E+01 |
| | | Exposure Point Total | | | | | 1E-04 | | | | | 2E+01 |
| | Exposure Medium Total | | | | | | 1E-04 | | | | | 2E+01 |
| Medium Total | | | | | | | 1E-04 | | | | | 2E+01 |
| Sediment | Surface Sediment | Exposure Unit 1 | 2,3,7,8-TCDD Equivalent | 2E-07 | -- | 8E-07 | 1E-06 | Developmental effects | 1E-02 | -- | 7E-02 | 8E-02 |
| | | | ARSENIC | 2E-07 | -- | 8E-07 | 1E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 5E-03 | -- | 2E-02 | 3E-02 |
| | | | BENZ(A)ANTHRACENE | 9E-06 | -- | 2E-04 | 2E-04 | -- | -- | -- | -- | |
| | | | BENZO(A)PYRENE | 2E-05 | -- | 4E-04 | 4E-04 | -- | -- | -- | -- | |
| | | | BENZO(B)FLUORANTHENE | 3E-06 | -- | 6E-05 | 6E-05 | -- | -- | -- | -- | |
| | | | BENZO(K)FLUORANTHENE | -- | -- | 2E-06 | 2E-06 | -- | -- | -- | -- | |
| | | | DIBENZ(A,H)ANTHRACENE | 3E-06 | -- | 7E-05 | 7E-05 | -- | -- | -- | -- | |
| | | | INDENO(1,2,3-CD)PYRENE | 1E-06 | -- | 2E-05 | 2E-05 | -- | -- | -- | | |
| | | | Chemical Total | 4E-05 | -- | 7E-04 | 7E-04 | | 2E-02 | -- | 9E-02 | 1E-01 |
| | | Exposure Point Total | | | | | 7E-04 | | | | | 1E-01 |
| | Exposure Medium Total | | | | | | 7E-04 | | | | | 1E-01 |
| Medium Total | | | | | | | 7E-04 | | | | | 1E-01 |
| Surface Soil | Outdoor Air | Exposure Unit 1 | None | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | Chemical Total | -- | -- | -- | 0E+00 | | -- | -- | -- | 0E+00 |
| | | Exposure Point Total | | | | | 0E+00 | | | | | 0E+00 |
| | Exposure Medium Total | | | | | | 0E+00 | | | | | 0E+00 |
| Medium Total | | | | | | | 0E+00 | | | | | 0E+00 |

TABLE 7.1 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Trespasser |
| Receptor Age: | Older Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Soil | Surface Soil | Exposure Unit 1 | 2,3,7,8-TCDD Equivalent | 1E-06 | -- | 7E-06 | 8E-06 | Developmental effects | 1E-01 | -- | 5E-01 | 6E-01 |
| | | | ARSENIC | 2E-07 | -- | 1E-06 | 1E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 6E-03 | -- | 3E-02 | 4E-02 |
| | | | HIGHLY CHLORINATED PCBs | 5E-08 | -- | 1E-06 | 1E-06 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 1E-02 | -- | 3E-01 | 3E-01 |
| | | | BENZ(A)ANTHRACENE | 5E-07 | -- | 9E-06 | 1E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 5E-06 | -- | 9E-05 | 1E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 4E-07 | -- | 8E-06 | 8E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 1E-06 | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 3E-07 | -- | 6E-06 | 6E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 9E-06 | -- | 1E-04 | 2E-04 | | 1E-01 | -- | 9E-01 | 1E+00 |
| | | Exposure Point Total | | | | | 2E-04 | | | | | 1E+00 |
| | Exposure Medium Total | | | | | | 2E-04 | | | | | 1E+00 |
| Medium Total | | | | | | | 2E-04 | | | | | 1E+00 |
| Surface Water | Surface Water | Exposure Unit 1 | BENZ(A)ANTHRACENE | -- | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | 2E-04 | 2E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | -- | -- | 3E-05 | 3E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | -- | -- | 1E-05 | 1E-05 | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | 3E-04 | 3E-04 | | -- | -- | -- | 0E+00 |
| | | Exposure Point Total | | | | | 3E-04 | | | | | 0E+00 |
| | Exposure Medium Total | | | | | | 3E-04 | | | | | 0E+00 |
| Medium Total | | | | | | | 3E-04 | | | | | 0E+00 |
| Receptor Total | | | | | | | 1E-03 | | | | Receptor HI Total | 2E+01 |

Total Risk Across All Media = 1E-03

Total Hazard Across All Media = 2E+01

Total Liver HI Across All Media = 5E-02
Total Nervous System Effects HI Across All Media = 3E+00
Total Ocular Effects HI Across All Media = 9E+00
Total Other Effects HI Across All Media = 9E+00

TABLE 7.2 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Trespasser |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Onondaga Lake Fish Tissue | Fish Tissue | Exposure Unit 1 | 2,3,7,8-TCDD Equivalent | 5E-04 | -- | -- | 5E-04 | Developmental effects | 7E+00 | -- | -- | 7E+00 |
| | | | ARSENIC | 2E-05 | -- | -- | 2E-05 | Hyperpigmentation (In); Vascular (V); PNS (N) | 1E-01 | -- | -- | 1E-01 |
| | | | MERCURY (AS METHYLMERCURY) | -- | -- | -- | -- | Developmental neuropsychological impairment (N) | 4E+00 | -- | -- | 4E+00 |
| | | | HIGHLY CHLORINATED PCBs | 2E-04 | -- | -- | 2E-04 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep | 1E+01 | -- | -- | 1E+01 |
| | | | LESS CHLORINATED PCBs | 1E-04 | -- | -- | 1E-04 | Reduced birth weights (W) | 2E+00 | -- | -- | 2E+00 |
| | | | 4,4-DDD | 5E-07 | -- | -- | 5E-07 | -- | -- | -- | -- | -- |
| | | | 4,4'-DDT | 5E-07 | -- | -- | 5E-07 | Liver lesions (H) | 7E-03 | -- | -- | 7E-03 |
| | | | ALDRIN | 7E-06 | -- | -- | 7E-06 | Liver toxicity (H) | 3E-02 | -- | -- | 3E-02 |
| | | | DELTA-BHC | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | DIELDRIN | 9E-06 | -- | -- | 9E-06 | | 3E-02 | -- | -- | 3E-02 |
| | | | HEPTACHLOR EPOXIDE | 6E-06 | -- | -- | 6E-06 | Increased liver-to-body weight ratio in males and females (H) | 1E-01 | -- | -- | 1E-01 |
| | | | BIS(2-ETHYLHEXYL)PHTHALATE | 5E-06 | -- | -- | 5E-06 | Increased relative liver weight (H) | 4E-02 | -- | -- | 4E-02 |
| | | | HEXACHLOROBENZENE | 3E-06 | -- | -- | 3E-06 | Hepatic (H) | 6E-03 | -- | -- | 6E-03 |
| | | | Chemical Total | 8E-04 | -- | -- | 8E-04 | | 2E+01 | -- | -- | 2E+01 |
| | | Exposure Point Total | | | | | 8E-04 | | | | | 2E+01 |
| | Exposure Medium Total | | | | | | 8E-04 | | | | | 2E+01 |
| Medium Total | | | | | | | 8E-04 | | | | | 2E+01 |
| Sediment | Surface Sediment | Exposure Unit 1 | BENZ(A)ANTHRACENE | 7E-06 | -- | 3E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 2E-05 | -- | 7E-05 | 9E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 2E-06 | -- | 1E-05 | 1E-05 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 3E-06 | -- | 1E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 8E-07 | -- | 4E-06 | 5E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 3E-05 | -- | 1E-04 | 2E-04 | | -- | -- | -- | 0E+00 |
| | | Exposure Point Total | | | | | 2E-04 | | | | | 0E+00 |
| | Exposure Medium Total | | | | | | 2E-04 | | | | | 0E+00 |
| Medium Total | | | | | | | 2E-04 | | | | | 0E+00 |
| Surface Soil | Outdoor Air | Exposure Unit 1 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |

TABLE 7.2 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Trespasser |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Soil | Surface Soil | Exposure Unit 1 | 2,3,7,8-TCDD Equivalent | 3E-06 | -- | 3E-06 | 6E-06 | Developmental effects | 4E-02 | -- | 4E-02 | 9E-02 |
| | | | BENZ(A)ANTHRACENE | 4E-07 | -- | 2E-06 | 2E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 4E-06 | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 3E-07 | -- | 1E-06 | 2E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 8E-07 | -- | 4E-06 | 5E-06 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 2E-07 | -- | 1E-06 | 1E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 8E-06 | -- | 3E-05 | 4E-05 | | 4E-02 | -- | 4E-02 | 9E-02 |
| | | Exposure Point Total | | | | | 4E-05 | | | | | 9E-02 |
| | Exposure Medium Total | | | | | | 4E-05 | | | | | 9E-02 |
| Medium Total | | | | | | | 4E-05 | | | | | 9E-02 |
| Surface Water | Surface Water | Exposure Unit 1 | BENZ(A)ANTHRACENE | -- | -- | 4E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | 4E-04 | 4E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | -- | -- | 5E-05 | 5E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | -- | -- | 3E-05 | 3E-05 | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | 5E-04 | 5E-04 | | -- | -- | -- | 0E+00 |
| | | Exposure Point Total | | | | | 5E-04 | | | | | 0E+00 |
| | Exposure Medium Total | | | | | | 5E-04 | | | | | 0E+00 |
| Medium Total | | | | | | | 5E-04 | | | | | 0E+00 |
| Receptor Total | | | | | | | 2E-03 | | | | Receptor HI Total | 2E+01 |

| | |
|---|---|
| Total Risk Across All Media = | 2E-03 |
| Total Hazard Across All Media = | 2E+01 |
| Total Liver HI Across All Media = | 2E-01 |
| Total Nervous System Effects HI Across All Media = | 4E+00 |
| Total Ocular Effects HI Across All Media = | 1E+01 |
| Total Other Effects HI Across All Media = | 1E+01 |

TABLE 7.3 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Sediment | Surface Sediment and Subsurface Sediment | Exposure Unit 1 | 2-METHYLNAPHTHALENE | -- | -- | -- | -- | Pulmonary alveolar proteinosis | 2E+00 | -- | 2E-01 | 2E+00 |
| | | | BENZ(A)ANTHRACENE | 1E-05 | -- | 1E-05 | 3E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 3E-05 | -- | 3E-05 | 6E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 4E-06 | -- | 5E-06 | 9E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 5E-06 | -- | 6E-06 | 1E-05 | -- | -- | -- | -- | -- |
| | | | DIBENZOFURAN | -- | -- | -- | -- | Reduced length and organ weight. Excess abdominal fat (O). | 2E+00 | -- | 2E-01 | 3E+00 |
| | | | INDENO(1,2,3-CD)PYRENE | 1E-06 | -- | 2E-06 | 3E-06 | -- | -- | -- | -- | -- |
| | | | NAPHTHALENE | -- | -- | -- | -- | Decreased body weight (W) | 1E+00 | -- | 9E-02 | 1E+00 |
| | | | Chemical Total | 5E-05 | -- | 6E-05 | 1E-04 | | -- | -- | -- | 4E+00 |
| | | Exposure Point Total | | | | | 1E-04 | | | | | 4E+00 |
| | Exposure Medium Total | | | | | | 1E-04 | | | | | 4E+00 |
| Medium Total | | | | | | | 1E-04 | | | | | 4E+00 |
| Soil | Surface Soil and Subsurface Soil | Exposure Unit 1 | 2,3,7,8-TCDD Equivalent | 7E-06 | -- | 6E-07 | 8E-06 | Developmental effects | 1E-01 | -- | 1E-02 | 1E-01 |
| | | | ARSENIC | 2E-06 | -- | 1E-07 | 2E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 1E-02 | -- | 9E-04 | 1E-02 |
| | | | BENZ(A)ANTHRACENE | 6E-06 | -- | 2E-06 | 9E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 4E-05 | -- | 2E-05 | 6E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 6E-06 | -- | 2E-06 | 8E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 5E-06 | -- | 2E-06 | 7E-06 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 1E-06 | -- | 6E-07 | 2E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 7E-05 | -- | 3E-05 | 1E-04 | | 1E-01 | -- | 1E-02 | 2E-01 |
| | | Exposure Point Total | | | | | 1E-04 | | | | | 2E-01 |
| | Exposure Medium Total | | | | | | 1E-04 | | | | | 2E-01 |
| Medium Total | | | | | | | 1E-04 | | | | | 2E-01 |
| Surface Soil and Subsurface Soil | Outdoor Air | Exposure Unit 1 | CHROMIUM | -- | 2E-05 | -- | 2E-05 | -- | -- | 4E-02 | -- | 4E-02 |
| | | | 1,4-DICHLOROBENZENE | -- | 2E-06 | -- | 2E-06 | Liver | -- | 6E-04 | -- | 6E-04 |
| | | | Chemical Total | -- | 2E-05 | -- | 2E-05 | | -- | 4E-02 | -- | 4E-02 |
| | | Exposure Point Total | | | | | 2E-05 | | | | | 4E-02 |
| | Exposure Medium Total | | | | | | 2E-05 | | | | | 4E-02 |
| Medium Total | | | | | | | 2E-05 | | | | | 4E-02 |
| Shallow Ground Water | Shallow Ground Water | Exposure Unit 1 | BENZO(A)PYRENE | -- | -- | 2E-06 | 2E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | 2E-06 | 2E-06 | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | 2E-06 | | | | | -- |
| | Exposure Medium Total | | | | | | 2E-06 | | | | | -- |
| Medium Total | | | | | | | 2E-06 | | | | | -- |

TABLE 7.3 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

Scenario Timeframe: Current/Future
Receptor Population: Utility Worker
Receptor Age: Adult

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Water | Surface Water | Exposure Unit 1 | BENZ(A)ANTHRACENE | -- | -- | 1E-05 | 1E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | 1E-04 | 1E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | -- | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | -- | -- | 9E-06 | 9E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | 2E-04 | 2E-04 | | -- | -- | -- | 0E+00 |
| | | Exposure Point Total | | | | | 2E-04 | | | | | 0E+00 |
| | Exposure Medium Total | | | | | | 2E-04 | | | | | 0E+00 |
| Medium Total | | | | | | | 2E-04 | | | | | 0E+00 |
| Receptor Total | | | | | | | 4E-04 | | | | Receptor HI Total | 4E+00 |

Total Risk Across All Media = 4E-04

Receptor HI Total 4E+00

Total Liver HI Across All Media = 6E-04
Total Nervous System Effects HI Across All Media = 1E-02
Total Other Effects HI Across All Media = 4E+00

TABLE 7.3a RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SYW-12
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Soil | Surface Soil and Subsurface Soil | Exposure Unit 9 | BENZO(A)PYRENE | 5E-06 | -- | 2E-06 | 6E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 5E-06 | -- | 2E-06 | 6E-06 | | -- | -- | -- | 0E+00 |
| | | Exposure Point Total | | | | | 6E-06 | | | | | 0E+00 |
| | Exposure Medium Total | | | | | | 6E-06 | | | | | 0E+00 |
| Medium Total | | | | | | | 6E-06 | | | | | 0E+00 |
| Surface Soil and Subsurface Soil | Outdoor Air | Exposure Unit 9 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Shallow Ground Water | Shallow Ground Water | Exposure Unit 9 | BENZ(A)ANTHRACENE | -- | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | 3E-04 | 3E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | -- | -- | 4E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | 4E-04 | 4E-04 | | -- | -- | -- | 0E+00 |
| | | Exposure Point Total | | | | | 4E-04 | | | | | 0E+00 |
| | Exposure Medium Total | | | | | | 4E-04 | | | | | 0E+00 |
| Medium Total | | | | | | | 4E-04 | | | | | 0E+00 |
| Receptor Total | | | | | | | 4E-04 | | | | Receptor HI Total | 0E+00 |

Total Risk Across All Media = 4E-04

Total Hazard Across All Media = 0E+00

TABLE 7.4 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Sediment | Surface Sediment and Subsurface Sediment | Exposure Unit 1 | 2-METHYLNAPHTHALENE | -- | -- | -- | -- | Pulmonary alveolar proteinosis | 2E+00 | -- | 2E+00 | 4E+00 |
| | | | BENZ(A)ANTHRACENE | 6E-06 | -- | 7E-06 | 1E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 1E-05 | -- | 2E-05 | 3E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 2E-06 | -- | 2E-06 | 5E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 3E-06 | -- | 3E-06 | 5E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZOFURAN | -- | -- | -- | -- | Reduced length and organ weight. Excess abdominal fat (O). | 2E+00 | -- | 2E+00 | 5E+00 |
| | | | INDENO(1,2,3-CD)PYRENE | 7E-07 | -- | 9E-07 | 2E-06 | -- | -- | -- | -- | |
| | | | NAPHTHALENE | -- | -- | -- | -- | Decreased body weight (W) | 1E+00 | -- | 1E+00 | 2E+00 |
| | | | Chemical Total | 3E-05 | -- | 3E-05 | 6E-05 | | 5E+00 | -- | 5E+00 | 1E+01 |
| | | Exposure Point Total | | | | | 6E-05 | | | | | 1E+01 |
| | Exposure Medium Total | | | | | | 6E-05 | | | | | 1E+01 |
| Medium Total | | | | | | | 6E-05 | | | | | 1E+01 |
| Soil | Surface Soil and Subsurface Soil | Exposure Unit 1 | 2,3,7,8-TCDD Equivalent | 4E-06 | -- | 3E-07 | 4E-06 | Developmental effects | 2E+00 | -- | 2E-01 | 2E+00 |
| | | | BENZ(A)ANTHRACENE | 3E-06 | -- | 1E-06 | 4E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 2E-05 | -- | 9E-06 | 3E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 3E-06 | -- | 1E-06 | 4E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 2E-06 | -- | 9E-07 | 3E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 3E-05 | -- | 1E-05 | 5E-05 | | 2E+00 | -- | 2E-01 | 2E+00 |
| | | Exposure Point Total | | | | | 5E-05 | | | | | 2E+00 |
| | Exposure Medium Total | | | | | | 5E-05 | | | | | 2E+00 |
| Medium Total | | | | | | | 5E-05 | | | | | 2E+00 |
| Surface Soil and Subsurface Soil | Outdoor Air | Exposure Unit 1 | ALUMINUM | -- | -- | -- | -- | Psychomotor and cognative impairments | -- | 1E+00 | -- | 1E+00 |
| | | | CHROMIUM | -- | 2E-05 | -- | 2E-05 | -- | -- | 1E+00 | -- | 1E+00 |
| | | | MANGANESE | -- | -- | -- | -- | Neurobehavioral changes (N, O) | -- | 6E+00 | -- | 6E+00 |
| | | | 1,4-DICHLOROBENZENE | -- | 2E-06 | -- | 2E-06 | Liver | -- | 2E-02 | -- | 2E-02 |
| | | | Chemical Total | -- | 2E-05 | -- | 2E-05 | | -- | 9E+00 | -- | 9E+00 |
| | | Exposure Point Total | | | | | 2E-05 | | | | | 9E+00 |
| | Exposure Medium Total | | | | | | 2E-05 | | | | | 9E+00 |
| Medium Total | | | | | | | 2E-05 | | | | | 9E+00 |
| Shallow Ground Water | Shallow Ground Water | Exposure Unit 1 | None | -- | -- | -- | -- | -- | -- | -- | -- | |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |

TABLE 7.4 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Water | Surface Water | Exposure Unit 1 | BENZ(A)ANTHRACENE | -- | -- | 7E-06 | 7E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | 6E-05 | 6E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | -- | -- | 9E-06 | 9E-06 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | -- | -- | 4E-06 | 4E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | 8E-05 | 8E-05 | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | 8E-05 | | | | | -- |
| | Exposure Medium Total | | | | | | 8E-05 | | | | | -- |
| Medium Total | | | | | | | 8E-05 | | | | | -- |
| Receptor Total | | | | | | | 2E-04 | Receptor HI Total | | | | 2E+01 |

| | |
|---|---|
| Total Risk Across All Media = | 2E-04 |
| Total Hazard Across All Media = | 2E+01 |
| Total Liver HI Across All Media = | 2E-02 |
| Total Nervous System Effects HI Across All Media = | 8E+00 |
| Total Nasal/Respiratory Effects HI Across All Media = | 4E+00 |
| Total Other Effects HI Across All Media = | 1E+01 |

TABLE 7.4a RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SYW-12
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Soil | Surface Soil and Subsurface Soil | Exposure Unit 9 | BENZO(A)PYRENE | 2E-06 | -- | 9E-07 | 3E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 2E-06 | -- | 9E-07 | 3E-06 | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | 3E-06 | | | | | -- |
| | Exposure Medium Total | | | | | | 3E-06 | | | | | -- |
| Medium Total | | | | | | | 3E-06 | | | | | -- |
| Surface Soil and Subsurface Soil | Outdoor Air | Exposure Unit 9 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Shallow Ground Water | Shallow Ground Water | Exposure Unit 9 | CHROMIUM | -- | -- | -- | -- | -- | -- | -- | 1E+00 | 1E+00 |
| | | | BENZ(A)ANTHRACENE | -- | -- | 9E-06 | 9E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | 2E-04 | 2E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | -- | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | 2E-04 | 2E-04 | | -- | -- | 1E+00 | 1E+00 |
| | | Exposure Point Total | | | | | 2E-04 | | | | | 1E+00 |
| | Exposure Medium Total | | | | | | 2E-04 | | | | | 1E+00 |
| Medium Total | | | | | | | 2E-04 | | | | | 1E+00 |
| Receptor Total | | | | | | | 2E-04 | | | | Receptor HI Total | 1E+00 |

Total Risk Across All Media = 2E-04

Total Hazard Across All Media = 1E+00

Total Other Effects HI Across All Media = 1E+00

TABLE 7.5 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Surveillance Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Soil | Surface Soil | Exposure Unit 2 | 2,3,7,8-TCDD Equivalent | 3E-06 | -- | 2E-07 | 4E-06 | Developmental effects | 6E-02 | -- | 3E-03 | 7E-02 |
| | | | Chemical Total | 3E-06 | -- | 2E-07 | 4E-06 | | 6E-02 | -- | 3E-03 | 7E-02 |
| | | Exposure Point Total | | | | | 4E-06 | | | | | 7E-02 |
| | Exposure Medium Total | | | | | | 4E-06 | | | | | 7E-02 |
| Medium Total | | | | | | | 4E-06 | | | | | 7E-02 |
| Surface Soil | Outdoor Air | Exposure Unit 2 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Receptor Total | | | | | | | 4E-06 | | | | Receptor HI Total | 7E-02 |

Total Risk Across All Media = 4E-06

Total Hazard Across All Media = 7E-02

TABLE 7.6 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Ditch Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Sediment | Surface Sediment | Exposure Unit 3 | None | -- | -- | -- | | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Surface Soil | Outdoor Air | Exposure Unit 3 | None | -- | -- | -- | | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Surface Water | Surface Water | Exposure Unit 3 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Receptor Total | | | | | | | 0E+00 | | | | Receptor HI Total | 0E+00 |

Total Risk Across All Media = 0E+00

Total Hazard Across All Media = 0E+00

TABLE 7.7 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Railroad Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 4 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Soil | Surface Soil | Exposure Unit 4 | ARSENIC | 5E-06 | -- | 1E-06 | 7E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 3E-02 | -- | 7E-03 | 4E-02 |
| | | | BENZO(A)PYRENE | 8E-07 | -- | 7E-07 | 1E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 6E-06 | -- | 2E-06 | 8E-06 | | 3E-02 | -- | 7E-03 | 4E-02 |
| | | Exposure Point Total | | | | | 8E-06 | | | | | 4E-02 |
| | Exposure Medium Total | | | | | | 8E-06 | | | | | 4E-02 |
| Medium Total | | | | | | | 8E-06 | | | | | 4E-02 |
| Receptor Total | | | | | | | 8E-06 | | | | Receptor HI Total | 4E-02 |

Total Risk Across All Media = 8E-06

Total Hazard Across All Media = 4E-02

TABLE 7.7a RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SYW-12
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Railroad Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 9 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Soil | Surface Soil | Exposure Unit 9 | 2,3,7,8-TCDD Equivalent | 1E-06 | -- | 2E-07 | 1E-06 | -- | 2E-02 | -- | 5E-03 | 3E-02 |
| | | | ARSENIC | 2E-06 | -- | 5E-07 | 3E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 2E-02 | -- | 3E-03 | 2E-02 |
| | | | BENZ(A)ANTHRACENE | 2E-06 | -- | 2E-06 | 3E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 1E-05 | -- | 1E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 2E-06 | -- | 2E-06 | 3E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 1E-06 | -- | 1E-06 | 2E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 2E-05 | -- | 2E-05 | 4E-05 | | 4E-02 | -- | 8E-03 | 5E-02 |
| | | Exposure Point Total | | | | | 4E-05 | | | | | 5E-02 |
| | Exposure Medium Total | | | | | | 4E-05 | | | | | 5E-02 |
| Medium Total | | | | | | | 4E-05 | | | | | 5E-02 |
| Receptor Total | | | | | | | 4E-05 | | | | Receptor HI Total | 5E-02 |

Total Risk Across All Media = 4E-05

Total Hazard Across All Media = 5E-02

TABLE 7.8 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Commercial/Industrial Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 5 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Soil | Surface Soil | Exposure Unit 5 | ARSENIC | 8E-06 | -- | 2E-06 | 1E-05 | Hyperpigmentation (In); Vascular (V); PNS (N) | 5E-02 | -- | 1E-02 | 6E-02 |
| | | | HIGHLY CHLORINATED PCBs | 4E-06 | -- | 6E-06 | 1E-05 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 3E-01 | -- | 4E-01 | 7E-01 |
| | | | BENZ(A)ANTHRACENE | 9E-06 | -- | 1E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 9E-05 | -- | 1E-04 | 2E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 8E-06 | -- | 1E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(K)FLUORANTHENE | 1E-06 | -- | 1E-06 | 2E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 3E-05 | -- | 3E-05 | 6E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 7E-06 | -- | 9E-06 | 2E-05 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 2E-04 | -- | 2E-04 | 3E-04 | | 3E-01 | -- | 4E-01 | 8E-01 |
| | | Exposure Point Total | | | | | 3E-04 | | | | | 8E-01 |
| | Exposure Medium Total | | | | | | 3E-04 | | | | | 8E-01 |
| Medium Total | | | | | | | 3E-04 | | | | | 8E-01 |
| Receptor Total | | | | | | | 3E-04 | | | | Receptor HI Total | 8E-01 |

Total Risk Across All Media = 3E-04

Total Hazard Across All Media = 8E-01

Total Nervous System Effects HI Across All Media = 6E-02
Total Ocular Effects HI Across All Media = 7E-01

TABLE 7.9 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Commercial/Industrial Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 7 | 1,4-DICHLOROBENZENE | -- | 5E-06 | -- | 5E-06 | Liver | -- | 2E-03 | -- | 2E-03 |
| | | | Chemical Total | -- | 5E-06 | -- | 5E-06 | | -- | 2E-03 | -- | 2E-03 |
| | | Exposure Point Total | | | | | 5E-06 | | | | | 2E-03 |
| | Exposure Medium Total | | | | | | 5E-06 | | | | | 2E-03 |
| Medium Total | | | | | | | 5E-06 | | | | | 2E-03 |
| Soil | Surface Soil | Exposure Unit 7 | 2,3,7,8-TCDD Equivalent | 3E-05 | -- | 8E-06 | 4E-05 | Developmental effects | 5E-01 | -- | 2E-01 | 7E-01 |
| | | | ARSENIC | 5E-06 | -- | 1E-06 | 6E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 3E-02 | -- | 9E-03 | 4E-02 |
| | | | HIGHLY CHLORINATED PCBs | 1E-06 | -- | 1E-06 | 2E-06 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 7E-02 | -- | 1E-01 | 2E-01 |
| | | | LESS CHLORINATED PCBs | 5E-07 | -- | 7E-07 | 1E-06 | Reduced birth weights (W) | 1E-02 | -- | 1E-02 | 2E-02 |
| | | | BENZ(A)ANTHRACENE | 5E-06 | -- | 6E-06 | 1E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 4E-05 | -- | 6E-05 | 1E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 3E-06 | -- | 4E-06 | 7E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 8E-06 | -- | 1E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 3E-06 | -- | 3E-06 | 6E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 1E-04 | -- | 9E-05 | 2E-04 | | 6E-01 | -- | 3E-01 | 9E-01 |
| | | Exposure Point Total | | | | | 2E-04 | | | | | 9E-01 |
| | Exposure Medium Total | | | | | | 2E-04 | | | | | 9E-01 |
| Medium Total | | | | | | | 2E-04 | | | | | 9E-01 |
| Ground Water | Potable Water | Exposure Unit 8 | ARSENIC | 1E-04 | -- | -- | 1E-04 | Hyperpigmentation (In); Vascular (V); PNS (N) | 6E-01 | -- | -- | 6E-01 |
| | | | IRON | -- | -- | -- | -- | Gastrointestinal effects | 1E+00 | -- | -- | 1E+00 |
| | | | THALLIUM | -- | -- | -- | -- | Hematological effects | 2E+00 | -- | -- | 2E+00 |
| | | | 4,4'-DDT | 3E-06 | -- | -- | 3E-06 | Liver lesions (H) | 4E-02 | -- | -- | 4E-02 |
| | | | ALDRIN | 4E-06 | -- | -- | 4E-06 | Liver toxicity (H) | 2E-02 | -- | -- | 2E-02 |
| | | | ALPHA-BHC | 8E-06 | -- | -- | 8E-06 | -- | -- | -- | -- | -- |
| | | | 2,4-DIMETHYLPHENOL | -- | -- | -- | -- | Clinical signs (lethargy, prostration, and ataxia) and hematological changes (B) | 4E+00 | -- | -- | 4E+00 |
| | | | 2-METHYLNAPHTHALENE | -- | -- | -- | -- | Pulmonary alveolar proteinosis | 3E+00 | -- | -- | 3E+00 |
| | | | 3&4-METHYLPHENOL | -- | -- | -- | -- | Decreased body weight and neurotoxicity | 2E+00 | -- | -- | 2E+00 |
| | | | 4-METHYLPHENOL | -- | -- | -- | -- | -- | 3E+00 | -- | -- | 3E+00 |
| | | | BENZ(A)ANTHRACENE | 3E-04 | -- | -- | 3E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 1E-03 | -- | -- | 1E-03 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 1E-04 | -- | -- | 1E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(K)FLUORANTHENE | 9E-06 | -- | -- | 9E-06 | -- | -- | -- | -- | -- |

TABLE 7.9 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Commercial/Industrial Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| | | | BIS(2-ETHYLHEXYL)PHTHALATE | 1E-06 | -- | -- | 1E-06 | Increased relative liver weight (H) | 1E-02 | -- | -- | 1E-02 |
| | | | CHRYSENE | 2E-06 | -- | -- | 2E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 1E-04 | -- | -- | 1E-04 | -- | -- | -- | -- | -- |
| | | | DIBENZOFURAN | -- | -- | -- | -- | Reduced length and organ weight. Excess abdominal fat (O). | 4E+00 | -- | -- | 4E+00 |
| | | | INDENO(1,2,3-CD)PYRENE | 4E-05 | -- | -- | 4E-05 | -- | -- | -- | -- | -- |
| | | | NAPHTHALENE | -- | -- | -- | -- | Decreased body weight (W) | 4E+00 | -- | -- | 4E+00 |
| | | | 1,4-DICHLOROBENZENE | 2E-05 | -- | -- | 2E-05 | Liver | 1E-01 | -- | -- | 1E-01 |
| | | | BENZENE | 2E-03 | -- | -- | 2E-03 | Reduced lymphocyte count | 3E+01 | -- | -- | 3E+01 |
| | | | BROMODICHLOROMETHANE | 1E-06 | -- | -- | 1E-06 | Renal cytomegaly (R) | 3E-03 | -- | -- | 3E-03 |
| | | | TETRACHLOROETHENE | 1E-06 | -- | -- | 1E-06 | Hepatotoxicity in mice (H), weight gain in rats | 6E-04 | -- | -- | 6E-04 |
| | | | VINYL CHLORIDE | 6E-06 | -- | -- | 6E-06 | Liver cell polymorphism (H) | 7E-03 | -- | -- | 7E-03 |
| | | | Chemical Total | 4E-03 | -- | -- | 4E-03 | | 5E+01 | -- | -- | 5E+01 |
| | | Exposure Point Total | | | | | 4E-03 | | | | | 5E+01 |
| | Exposure Medium Total | | | | | | 4E-03 | | | | | 5E+01 |
| Medium Total | | | | | | | 4E-03 | | | | | 5E+01 |
| Receptor Total | | | | | | | 4E-03 | | | | Receptor HI Total | 5E+01 |

Total Risk Across All Media = 4E-03

Total Hazard Across All Media = 5E+01

| | |
|---|---|
| Total Liver HI Across All Media = | 2E-01 |
| Total Kidney HI Across All Media = | 3E-03 |
| Total Nervous System Effects HI Across All Media = | 6E+00 |
| Total Lymphocyte Effects HI Across All Media = | 3E+01 |
| Total Nasal/Respiratory Effects HI Across All Media = | 3E+00 |
| Total Ocular Effects HI Across All Media = | 2E-01 |
| Total Other Effects HI Across All Media = | 1E+01 |

TABLE 7.9a RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SYW-12
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Commercial/Industrial Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 9 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Soil | Surface Soil | Exposure Unit 9 | 2,3,7,8-TCDD Equivalent | 2E-06 | -- | 5E-07 | 2E-06 | Developmental effects | 3E-02 | -- | 9E-03 | 4E-02 |
| | | | ARSENIC | 3E-06 | -- | 1E-06 | 4E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 2E-02 | -- | 6E-03 | 3E-02 |
| | | | HIGHLY CHLORINATED PCBs | 7E-07 | -- | 9E-07 | 2E-06 | -- | 5E-02 | -- | 6E-02 | 1E-01 |
| | | | BENZ(A)ANTHRACENE | 2E-06 | -- | 3E-06 | 5E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 2E-05 | -- | 2E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 2E-06 | -- | 3E-06 | 6E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 1E-06 | -- | 2E-06 | 3E-06 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 5E-07 | -- | 6E-07 | 1E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 3E-05 | -- | 3E-05 | 6E-05 | | 1E-01 | -- | 8E-02 | 2E-01 |
| | | Exposure Point Total | | | | | 6E-05 | | | | | 2E-01 |
| | Exposure Medium Total | | | | | | 6E-05 | | | | | 2E-01 |
| Medium Total | | | | | | | 6E-05 | | | | | 2E-01 |
| Receptor Total | | | | | | | 6E-05 | | | | Receptor HI Total | 2E-01 |

Total Risk Across All Media = 6E-05

Total Hazard Across All Media = 2E-01

TABLE 7.10 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Recreational Visitor |
| Receptor Age: | Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Onondaga Lake Fish Tissue | Fish Tissue | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | 1E-04 | -- | -- | 1E-04 | Developmental effects | 1E+01 | -- | -- | 1E+01 |
| | | | ANTIMONY | -- | -- | -- | -- | Longevity (M); Blood glucose (E); Cholesterol (E) | 1E+00 | -- | -- | 1E+00 |
| | | | ARSENIC | 6E-06 | -- | -- | 6E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 1E-01 | -- | -- | 1E-01 |
| | | | MERCURY (AS METHYLMERCURY | -- | -- | -- | -- | Developmental neuropsychological impairment (N) | 6E+00 | -- | -- | 6E+00 |
| | | | HIGHLY CHLORINATED PCBs | 6E-05 | -- | -- | 6E-05 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 2E+01 | -- | -- | 2E+01 |
| | | | LESS CHLORINATED PCBs | 5E-05 | -- | -- | 5E-05 | Reduced birth weights (W) | 4E+00 | -- | -- | 4E+00 |
| | | | ALDRIN | 2E-06 | -- | -- | 2E-06 | Liver toxicity (H) | 5E-02 | -- | -- | 5E-02 |
| | | | DELTA-BHC | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | DIELDRIN | 3E-06 | -- | -- | 3E-06 | Hepatic (H) | 4E-02 | -- | -- | 4E-02 |
| | | | HEPTACHLOR EPOXIDE | 2E-06 | -- | -- | 2E-06 | Increased liver-to-body weight ratio in males and females (H) | 2E-01 | -- | -- | 2E-01 |
| | | | BIS(2-ETHYLHEXYL)PHTHALATE | 2E-06 | -- | -- | 2E-06 | Increased relative liver weight (H) | 6E-02 | -- | -- | 6E-02 |
| | | | HEXACHLOROBENZENE | 1E-06 | -- | -- | 1E-06 | Hepatic (H) | 9E-03 | -- | -- | 9E-03 |
| | | | Chemical Total | 3E-04 | | | 3E-04 | | 4E+01 | | | 4E+01 |
| | | Exposure Point Total | | | | | 3E-04 | | | | | 4E+01 |
| | Exposure Medium Total | | | | | | 3E-04 | | | | | 4E+01 |
| Medium Total | | | | | | | 3E-04 | | | | | 4E+01 |
| Sediment | Surface Sediment | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | 2E-06 | -- | 3E-06 | 5E-06 | Developmental effects | 2E-01 | -- | 2E-01 | 4E-01 |
| | | | ARSENIC | 2E-06 | -- | 3E-06 | 5E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 5E-02 | -- | 7E-02 | 1E-01 |
| | | | CHROMIUM | -- | -- | -- | -- | None Reported (O) | 1E+00 | -- | -- | 1E+00 |
| | | | HIGHLY CHLORINATED PCBs | 2E-07 | -- | 1E-06 | 1E-06 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 6E-02 | -- | 3E-01 | 4E-01 |
| | | | BENZ(A)ANTHRACENE | 1E-04 | -- | 5E-04 | 6E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 7E-04 | -- | 4E-03 | 4E-03 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 2E-04 | -- | 8E-04 | 1E-03 | -- | -- | -- | -- | -- |
| | | | BENZO(K)FLUORANTHENE | 4E-06 | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |

TABLE 7.10 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Recreational Visitor |
| Receptor Age: | Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Sediment | Surface Sediment | Exposure Unit 6 | CHRYSENE | 1E-06 | -- | 7E-06 | 9E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 8E-05 | -- | 4E-04 | 5E-04 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 4E-05 | -- | 2E-04 | 2E-04 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 1E-03 | -- | 6E-03 | 7E-03 | | 2E+00 | -- | 6E-01 | 2E+00 |
| | | Exposure Point Total | | | | | 7E-03 | | | | | 2E+00 |
| | Exposure Medium Total | | | | | | 7E-03 | | | | | 2E+00 |
| Medium Total | | | | | | | 7E-03 | | | | | 2E+00 |
| Surface Soil | Outdoor Air | Exposure Unit 6 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Soil | Surface Soil | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | 1E-05 | -- | 1E-05 | 2E-05 | Developmental effects | 8E-01 | -- | 1E+00 | 2E+00 |
| | | | ARSENIC | 2E-06 | -- | 2E-06 | 4E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 4E-02 | -- | 5E-02 | 1E-01 |
| | | | HIGHLY CHLORINATED PCBs | 4E-07 | -- | 2E-06 | 3E-06 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 1E-01 | -- | 7E-01 | 8E-01 |
| | | | LESS CHLORINATED PCBs | 2E-07 | -- | 1E-06 | 1E-06 | Reduced birth weights (W) | 2E-02 | -- | 9E-02 | 1E-01 |
| | | | BENZ(A)ANTHRACENE | 5E-06 | -- | 2E-06 | 7E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 6E-05 | -- | 2E-05 | 8E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 4E-06 | -- | 2E-06 | 6E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 1E-05 | -- | 4E-06 | 1E-05 | -- | -- | -- | -- | -- |
| | | | HEXACHLOROBENZENE | 2E-07 | -- | 8E-07 | 1E-06 | Hepatic (H) | 2E-03 | -- | 8E-03 | 1E-02 |
| | | | INDENO(1,2,3-CD)PYRENE | 3E-06 | -- | 1E-06 | 4E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 9E-05 | -- | 5E-05 | 1E-04 | | 1E+00 | -- | 2E+00 | 3E+00 |
| | | Exposure Point Total | | | | | 1E-04 | | | | | 3E+00 |
| | Exposure Medium Total | | | | | | 1E-04 | | | | | 3E+00 |
| Medium Total | | | | | | | 1E-04 | | | | | 3E+00 |

TABLE 7.10 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Recreational Visitor |
| Receptor Age: | Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Water | Surface Water | Exposure Unit 6 | BENZ(A)ANTHRACENE | -- | -- | 1E-04 | 1E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | 1E-03 | 1E-03 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | -- | -- | 2E-04 | 2E-04 | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | 1E-03 | 1E-03 | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | 1E-03 | | | | | -- |
| | Exposure Medium Total | | | | | | 1E-03 | | | | | -- |
| Medium Total | | | | | | | 1E-03 | | | | | -- |
| Receptor Total | | | | | | | 9E-03 | | | | Receptor HI Total | 4E+01 |

Total Risk Across All Media = 9E-03

Total Hazard Across All Media = 4E+01

| | |
|---|---|
| Total Liver HI Across All Media = | 3E-01 |
| Total Nervous System Effects HI Across All Media = | 6E+00 |
| Total Ocular Effects HI Across All Media = | 2E+01 |
| Total Other Effects HI Across All Media = | 2E+01 |

TABLE 7.10a RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SYW-12
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Recreational Visitor |
| Receptor Age: | Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Soil | Surface Soil | Exposure Unit 9 | 2,3,7,8-TCDD Equivalent | 6E-07 | -- | 8E-07 | 1E-06 | -- | 5E-02 | -- | 6E-02 | 1E-01 |
| | | | ARSENIC | 1E-06 | -- | 2E-06 | 3E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 3E-02 | -- | 4E-02 | 7E-02 |
| | | | HIGHLY CHLORINATED PCBs | 2E-07 | -- | 1E-06 | 2E-06 | -- | 7E-02 | -- | 4E-01 | 5E-01 |
| | | | BENZ(A)ANTHRACENE | 6E-06 | -- | 3E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 4E-05 | -- | 2E-04 | 3E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 6E-06 | -- | 3E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(K)FLUORANTHENE | 2E-07 | -- | 1E-06 | 1E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 4E-06 | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 1E-06 | -- | 6E-06 | 7E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 6E-05 | -- | 3E-04 | 4E-04 | | 2E-01 | -- | 5E-01 | 7E-01 |
| | | Exposure Point Total | | | | | 4E-04 | | | | | 7E-01 |
| | Exposure Medium Total | | | | | | 4E-04 | | | | | 7E-01 |
| Medium Total | | | | | | | 4E-04 | | | | | 7E-01 |
| Surface Soil | Outdoor Air | Exposure Unit 9 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | 0E+00 | | -- | -- | -- | 0E+00 |
| | | Exposure Point Total | | | | | 0E+00 | | | | | 0E+00 |
| | Exposure Medium Total | | | | | | 0E+00 | | | | | 0E+00 |
| Medium Total | | | | | | | 0E+00 | | | | | 0E+00 |
| Receptor Total | | | | | | | 4E-04 | | | | Receptor HI Total | 7E-01 |

Total Risk Across All Media = 4E-04 Total Hazard Across All Media = 7E-01

TABLE 7.11 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Recreational Visitor |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Onondaga Lake Fish Tissue | Fish Tissue | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | 5E-04 | -- | -- | 5E-04 | Developmental effects | 7E+00 | -- | -- | 7E+00 |
| | | | ARSENIC | 2E-05 | -- | -- | 2E-05 | Hyperpigmentation (In); Vascular (V); PNS (N) | 1E-01 | -- | -- | 1E-01 |
| | | | MERCURY (AS METHYLMERCURY | -- | -- | -- | -- | Developmental neuropsychological impairment (N) | 4E+00 | -- | -- | 4E+00 |
| | | | HIGHLY CHLORINATED PCBs | 2E-04 | -- | -- | 2E-04 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 1E+01 | -- | -- | 1E+01 |
| | | | LESS CHLORINATED PCBs | 1E-04 | -- | -- | 1E-04 | Reduced birth weights (W) | 2E+00 | -- | -- | 2E+00 |
| | | | ALDRIN | 7E-06 | -- | -- | 7E-06 | Liver toxicity (H) | 3E-02 | -- | -- | 3E-02 |
| | | | DIELDRIN | 9E-06 | -- | -- | 9E-06 | Hepatic (H) | 3E-02 | -- | -- | 3E-02 |
| | | | HEPTACHLOR EPOXIDE | 6E-06 | -- | -- | 6E-06 | Increased liver-to-body weight ratio in males and females (H) | 1E-01 | -- | -- | 1E-01 |
| | | | BIS(2-ETHYLHEXYL)PHTHALATE | 5E-06 | -- | -- | 5E-06 | Increased relative liver weight (H) | 4E-02 | -- | -- | 4E-02 |
| | | | HEXACHLOROBENZENE | 3E-06 | -- | -- | 3E-06 | Hepatic (H) | 6E-03 | -- | -- | 6E-03 |
| | | | Chemical Total | 8E-04 | -- | -- | 8E-04 | | 2E+01 | -- | -- | 2E+01 |
| | | Exposure Point Total | | | | | 8E-04 | | | | | 2E+01 |
| | Exposure Medium Total | | | | | | 8E-04 | | | | | 2E+01 |
| Medium Total | | | | | | | 8E-04 | | | | | 2E+01 |
| Sediment | Surface Sediment | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | 6E-07 | -- | 6E-07 | 1E-06 | Developmental effects | 9E-03 | -- | 9E-03 | 2E-02 |
| | | | ARSENIC | 5E-07 | -- | 6E-07 | 1E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 3E-03 | -- | 3E-03 | 6E-03 |
| | | | BENZ(A)ANTHRACENE | 4E-06 | -- | 2E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 3E-05 | -- | 1E-04 | 1E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 6E-06 | -- | 3E-05 | 3E-05 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 3E-06 | -- | 1E-05 | 2E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 1E-06 | -- | 6E-06 | 8E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 4E-05 | -- | 2E-04 | 2E-04 | | 1E-02 | -- | 1E-02 | 2E-02 |
| | | Exposure Point Total | | | | | 2E-04 | | | | | 2E-02 |
| | Exposure Medium Total | | | | | | 2E-04 | | | | | 2E-02 |
| Medium Total | | | | | | | 2E-04 | | | | | 2E-02 |
| Surface Soil | Outdoor Air | Exposure Unit 6 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |

TABLE 7.11 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Recreational Visitor |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Soil | Surface Soil | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | 3E-06 | -- | 3E-06 | 6E-06 |
| | | | BENZ(A)ANTHRACENE | 2E-07 | -- | 9E-07 | 1E-06 |
| | | | BENZO(A)PYRENE | 2E-06 | -- | 1E-05 | 1E-05 |
| | | | DIBENZ(A,H)ANTHRACENE | 4E-07 | -- | 2E-06 | 2E-06 |
| | | | Chemical Total | 6E-06 | -- | 2E-05 | 2E-05 |
| | | Exposure Point Total | | | | | 2E-05 |
| | Exposure Medium Total | | | | | | 2E-05 |
| Medium Total | | | | | | | 2E-05 |
| Surface Water | Surface Water | Exposure Unit 6 | ANTIMONY | -- | -- | -- | -- |
| | | | BENZ(A)ANTHRACENE | -- | -- | 4E-05 | 4E-05 |
| | | | BENZO(A)PYRENE | -- | -- | 4E-04 | 4E-04 |
| | | | BENZO(B)FLUORANTHENE | -- | -- | 6E-05 | 6E-05 |
| | | | BENZENE | -- | -- | 1E-06 | 1E-06 |
| | | | Chemical Total | -- | -- | 5E-04 | 5E-04 |
| | | Exposure Point Total | | | | | 5E-04 |
| | Exposure Medium Total | | | | | | 5E-04 |
| Medium Total | | | | | | | 5E-04 |
| Receptor Total | | | | | | | 2E-03 |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Soil | Surface Soil | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | Developmental effects | 4E-02 | -- | 4E-02 | 9E-02 |
| | | | BENZ(A)ANTHRACENE | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | -- | -- | -- | -- | -- |
| | | | Chemical Total | | 4E-02 | -- | 4E-02 | 9E-02 |
| | | Exposure Point Total | | | | | | 9E-02 |
| | Exposure Medium Total | | | | | | | 9E-02 |
| Medium Total | | | | | | | | 9E-02 |
| Surface Water | Surface Water | Exposure Unit 6 | ANTIMONY | Longevity (M); Blood glucose (E); Cholesterol (E) | -- | -- | 1E-03 | 1E-03 |
| | | | BENZ(A)ANTHRACENE | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | -- | -- | -- | -- | -- |
| | | | BENZENE | Reduced lymphocyte count | -- | -- | 1E-02 | 1E-02 |
| | | | Chemical Total | | -- | -- | 1E-02 | 1E-02 |
| | | Exposure Point Total | | | | | | 1E-02 |
| | Exposure Medium Total | | | | | | | 1E-02 |
| Medium Total | | | | | | | | 1E-02 |
| Receptor Total | | | | | | | Receptor HI Total | 2E+01 |

Total Risk Across All Media = 2E-03

Total Hazard Across All Media = 2E+01

Total Nervous System Effects HI Across All Media = 6E-03
Total Lymphocyte Effects HI Across All Media = 1E-02
Total Other Effects HI Across All Media = 2E+01

TABLE 7.11a RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SYW-12
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Current/Future |
| Receptor Population: | Recreational Visitor |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 9 | None | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | | Chemical Total | | -- | | -- | | | -- | | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Soil | Surface Soil | Exposure Unit 9 | BENZ(A)ANTHRACENE | 2E-07 | -- | 1E-06 | 1E-06 | | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 2E-06 | -- | 8E-06 | 9E-06 | | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 2E-07 | -- | 1E-06 | 1E-06 | | -- | -- | -- | -- |
| | | | Chemical Total | 2E-06 | | 1E-05 | 1E-05 | | -- | | -- | -- |
| | | Exposure Point Total | | | | | 1E-05 | | | | | -- |
| | Exposure Medium Total | | | | | | 1E-05 | | | | | -- |
| Medium Total | | | | | | | 1E-05 | | | | | -- |
| Receptor Total | | | | | | | 1E-05 | Receptor HI Total | | | | -- |

Total Risk Across All Media = 1E-05

Total Hazard Across All Media = 0E+00

TABLE 7.12 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 6 | 1,4-DICHLOROBENZENE | -- | 8E-06 | -- | 8E-06 | Liver | -- | 1E-02 | -- | 1E-02 |
| | | | Chemical Total | -- | 8E-06 | -- | 8E-06 | | -- | 1E-02 | -- | 1E-02 |
| | | Exposure Point Total | | | | | 8E-06 | | | | | 1E-02 |
| | Exposure Medium Total | | | | | | 8E-06 | | | | | 1E-02 |
| Medium Total | | | | | | | 8E-06 | | | | | 1E-02 |
| Soil | Surface Soil | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | 8E-05 | -- | 1E-04 | 2E-04 | Developmental effects | 7E+00 | -- | 8E+00 | 1E+01 |
| | | | ARSENIC | 1E-05 | -- | 2E-05 | 3E-05 | Hyperpigmentation (In); Vascular (V); PNS (N) | 4E-01 | -- | 4E-01 | 8E-01 |
| | | | CADMIUM | -- | -- | -- | -- | Renal (R); Significant Proteinuria | 5E-01 | -- | 8E-01 | 1E+00 |
| | | | HIGHLY CHLORINATED PCBs | 3E-06 | -- | 2E-05 | 2E-05 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 1E+00 | -- | 6E+00 | 7E+00 |
| | | | LESS CHLORINATED PCBs | 2E-06 | -- | 9E-06 | 1E-05 | Reduced birth weights (W) | 1E-01 | -- | 8E-01 | 9E-01 |
| | | | DIELDRIN | 2E-06 | -- | -- | 2E-06 | Hepatic (H) | 3E-02 | -- | -- | 3E-02 |
| | | | BENZ(A)ANTHRACENE | 4E-05 | -- | 1E-05 | 6E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 5E-04 | -- | 2E-04 | 7E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 4E-05 | -- | 1E-05 | 5E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(K)FLUORANTHENE | 3E-06 | -- | 1E-06 | 4E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 9E-05 | -- | 3E-05 | 1E-04 | -- | -- | -- | -- | -- |
| | | | HEXACHLOROBENZENE | 2E-06 | -- | 7E-06 | 9E-06 | Hepatic (H) | 2E-02 | -- | 6E-02 | 8E-02 |
| | | | INDENO(1,2,3-CD)PYRENE | 3E-05 | -- | 9E-06 | 3E-05 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 8E-04 | -- | 4E-04 | 1E-03 | | 9E+00 | -- | 2E+01 | 2E+01 |
| | | Exposure Point Total | | | | | 1E-03 | | | | | 2E+01 |
| | Exposure Medium Total | | | | | | 1E-03 | | | | | 2E+01 |
| Medium Total | | | | | | | 1E-03 | | | | | 2E+01 |
| Ground Water | Potable Water | Exposure Unit 8 | ALUMINUM | -- | -- | -- | -- | Neurotoxicity | 2E+00 | -- | 1E-02 | 2E+00 |
| | | | ARSENIC | 8E-05 | -- | 5E-07 | 8E-05 | Hyperpigmentation (In); Vascular (V); PNS (N) | 2E+00 | -- | 1E-02 | 2E+00 |
| | | | CHROMIUM | -- | -- | -- | -- | -- | 1E+00 | -- | 8E-01 | 2E+00 |
| | | | IRON | -- | -- | -- | -- | Gastrointestinal effects | 4E+00 | -- | 2E-02 | 4E+00 |
| | | | THALLIUM | -- | -- | -- | -- | Hematological effects | 6E+00 | -- | 4E-02 | 6E+00 |
| | | | 4,4'-DDT | 2E-06 | -- | 2E-05 | 2E-05 | Liver lesions (H) | 1E-01 | -- | 2E+00 | 2E+00 |
| | | | ALDRIN | 3E-06 | -- | 3E-07 | 3E-06 | Liver toxicity (H) | 7E-02 | -- | 6E-03 | 8E-02 |
| | | | ALPHA-BHC | 7E-06 | -- | -- | 7E-06 | -- | -- | -- | -- | -- |
| | | | 2,4-DIMETHYLPHENOL | -- | -- | -- | -- | Clinical signs (lethargy, prostration, and ataxia) and hematological changes (B) | 1E+01 | -- | 2E+00 | 1E+01 |
| | | | 2-METHYLNAPHTHALENE | -- | -- | -- | -- | Pulmonary alveolar proteinosis | 1E+01 | -- | -- | 1E+01 |
| | | | 2-METHYLPHENOL | -- | -- | -- | -- | Decreased body weights and neurotoxicity | 1E+00 | -- | 1E-01 | 1E+00 |

TABLE 7.12 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Ground Water | Potable Water | Exposure Unit 8 | 3&4-METHYLPHENOL | -- | -- | -- | -- | Decreased body weight and neurotoxicity | 6E+00 | -- | 5E-01 | 6E+00 |
| | | | 4-METHYLPHENOL | -- | -- | -- | -- | -- | 1E+01 | -- | 1E+00 | 1E+01 |
| | | | BENZ(A)ANTHRACENE | 2E-04 | -- | 2E-02 | 2E-02 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 8E-04 | -- | 5E-01 | 5E-01 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 8E-05 | -- | 6E-02 | 6E-02 | -- | -- | -- | -- | -- |
| | | | BENZO(K)FLUORANTHENE | 7E-06 | -- | -- | 7E-06 | -- | -- | -- | -- | -- |
| | | | BIS(2-ETHYLHEXYL)PHTHALATE | 8E-07 | -- | 1E-06 | 2E-06 | Increased relative liver weight (H) | 3E-02 | -- | 5E-02 | 8E-02 |
| | | | CHRYSENE | 1E-06 | -- | 5E-04 | 5E-04 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 1E-04 | -- | 1E-01 | 1E-01 | -- | -- | -- | -- | -- |
| | | | DIBENZOFURAN | -- | -- | -- | -- | Reduced length and organ weight. Excess abdominal fat (O). | 1E+01 | -- | -- | 1E+01 |
| | | | FLUORANTHENE | -- | -- | -- | -- | Nephropathy, increased liver weights (H), hematological alterations (B), and clinical effects | 3E-01 | -- | 1E+00 | 2E+00 |
| | | | HEXACHLOROBUTADIENE | 4E-07 | -- | 1E-06 | 1E-06 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 3E-05 | -- | 2E-02 | 2E-02 | -- | -- | -- | -- | -- |
| | | | NAPHTHALENE | -- | -- | -- | -- | Decreased body weight (W) | 1E+01 | -- | 8E+00 | 2E+01 |
| | | | PHENANTHRENE | -- | -- | -- | -- | -- | 9E-01 | -- | 2E+00 | 3E+00 |
| | | | 1,4-DICHLOROBENZENE | 1E-05 | -- | 9E-06 | 2E-05 | Liver | 4E-01 | -- | 3E-01 | 7E-01 |
| | | | BENZENE | 2E-03 | -- | 3E-04 | 2E-03 | Reduced lymphocyte count | 9E+01 | -- | 1E+01 | 1E+02 |
| | | | BROMODICHLOROMETHANE | 1E-06 | -- | 8E-08 | 1E-06 | Renal cytomegaly (R) | 1E-02 | -- | 8E-04 | 1E-02 |
| | | | TETRACHLOROETHENE | 9E-07 | -- | 5E-07 | 1E-06 | Hepatotoxicity in mice (H), weight gain in rats | 2E-03 | -- | 1E-03 | 3E-03 |
| | | | TOLUENE | -- | -- | -- | -- | Increased kidney weight (R) | 1E+00 | -- | 3E-01 | 1E+00 |
| | | | VINYL CHLORIDE | 5E-06 | -- | 2E-07 | 5E-06 | Liver cell polymorphism (H) | 2E-02 | -- | 1E-03 | 2E-02 |
| | | | Chemical Total | 3E-03 | -- | 7E-01 | 7E-01 | | 2E+02 | -- | 3E+01 | 2E+02 |
| | | Exposure Point Total | | | | | 7E-01 | | | | | 2E+02 |
| | Exposure Medium Total | | | | | | 7E-01 | | | | | 2E+02 |

TABLE 7.12 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Ground Water | Shower Vapor | Exposure Unit 8 | 1,2,4-TRIMETHYLBENZENE | -- | -- | -- | -- | Hematological and Pulmonary | -- | 1E+02 | -- | 1E+02 |
| | | | 1,2-DICHLOROBENZENE | -- | -- | -- | -- | -- | -- | 8E+00 | -- | 8E+00 |
| | | | 1,4-DICHLOROBENZENE | -- | 9E-04 | -- | 9E-04 | Liver | -- | 1E+00 | -- | 1E+00 |
| | | | BENZENE | -- | 8E-03 | -- | 8E-03 | Decreased lymphocyte count | -- | 4E+02 | -- | 4E+02 |
| | | | BROMODICHLOROMETHANE | -- | 2E-05 | -- | 2E-05 | -- | -- | -- | -- | -- |
| | | | CHLOROFORM | -- | 5E-05 | -- | 5E-05 | Hepatic effects | -- | 2E-01 | -- | 2E-01 |
| | | | VINYL CHLORIDE | -- | 2E-06 | -- | 2E-06 | Liver cell polymorphism | -- | 2E-02 | -- | 2E-02 |
| | | | XYLENES, TOTAL | -- | -- | -- | -- | Impaired motor coordination (decreased rotarod performance) | -- | 1E+01 | -- | 1E+01 |
| | | | Chemical Total | -- | 9E-03 | -- | 9E-03 | | -- | 5E+02 | -- | 5E+02 |
| | | Exposure Point Total | | | | | 9E-03 | | | | | 5E+02 |
| | Exposure Medium Total | | | | | | 9E-03 | | | | | 5E+02 |
| Medium Total | | | | | | | 7E-01 | | | | | 7E+02 |
| Receptor Total | | | | | | | 7E-01 | Receptor HI Total | | | | 8E+02 |

Total Risk Across All Media = 7E-01

Total Hazard Across All Media = 8E+02

| | |
|---|---|
| Total Liver HI Across All Media = | 6E+00 |
| Total Kidney HI Across All Media = | 1E+00 |
| Total Nervous System Effects HI Across All Media = | 3E+01 |
| Total Lymphocyte Effects HI Across All Media = | 5E+02 |
| Total Nasal/Respiratory Effects HI Across All Media = | 1E+02 |
| Total Ocular Effects HI Across All Media = | 7E+00 |
| Total Other Effects HI Across All Media = | 1E+02 |

TABLE 7.12a RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SYW-12
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Child |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 9 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Soil | Surface Soil | Exposure Unit 9 | 2,3,7,8-TCDD Equivalent | 5E-06 | -- | 6E-06 | 1E-05 | -- | 4E-01 | -- | 5E-01 | 9E-01 |
| | | | ARSENIC | 1E-05 | -- | 1E-05 | 2E-05 | Hyperpigmentation (In); Vascular (V); PNS (N) | 3E-01 | -- | 3E-01 | 6E-01 |
| | | | HIGHLY CHLORINATED PCBs | 2E-06 | -- | 1E-05 | 1E-05 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 6E-01 | -- | 4E+00 | 4E+00 |
| | | | BENZ(A)ANTHRACENE | 5E-05 | -- | 2E-05 | 7E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 4E-04 | -- | 1E-04 | 5E-04 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 5E-05 | -- | 2E-05 | 7E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(K)FLUORANTHENE | 2E-06 | -- | 6E-07 | 2E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 3E-05 | -- | 1E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 1E-05 | -- | 3E-06 | 1E-05 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 5E-04 | -- | 2E-04 | 7E-04 | | 1E+00 | -- | 4E+00 | 6E+00 |
| | | Exposure Point Total | | | | | 7E-04 | | | | | 6E+00 |
| | Exposure Medium Total | | | | | | 7E-04 | | | | | 6E+00 |
| Medium Total | | | | | | | 7E-04 | | | | | 6E+00 |
| Receptor Total | | | | | | | 7E-04 | | | | Receptor HI Total | 6E+00 |

Total Risk Across All Media = 7E-04

Total Hazard Across All Media = 6E+00

Total Nervous System Effects HI Across All Media = 6E-01
Total Ocular Effects HI Across All Media = 4E+00
Total Other Effects HI Across All Media = 9E-01

TABLE 7.13 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 6 | 1,4-DICHLOROBENZENE | -- | 1E-05 | -- | 1E-05 | Liver | -- | 3E-03 | -- | 3E-03 |
| | | | Chemical Total | -- | 1E-05 | -- | 1E-05 | | -- | 3E-03 | -- | 3E-03 |
| | | Exposure Point Total | | | | | 1E-05 | | | | | 3E-03 |
| | Exposure Medium Total | | | | | | 1E-05 | | | | | 3E-03 |
| Medium Total | | | | | | | 1E-05 | | | | | 3E-03 |
| Soil | Surface Soil | Exposure Unit 6 | 2,3,7,8-TCDD Equivalent | 2E-05 | -- | 5E-06 | 3E-05 | Developmental effects | 4E-01 | -- | 8E-02 | 4E-01 |
| | | | ARSENIC | 4E-06 | -- | 9E-07 | 5E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 2E-02 | -- | 5E-03 | 2E-02 |
| | | | HIGHLY CHLORINATED PCBs | 9E-07 | -- | 1E-06 | 2E-06 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 5E-02 | -- | 6E-02 | 1E-01 |
| | | | BENZ(A)ANTHRACENE | 2E-06 | -- | 2E-06 | 3E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 2E-05 | -- | 2E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 1E-06 | -- | 1E-06 | 3E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 4E-06 | -- | 4E-06 | 7E-06 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 1E-06 | -- | 1E-06 | 2E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 5E-05 | -- | 4E-05 | 9E-05 | | 4E-01 | -- | 1E-01 | 6E-01 |
| | | Exposure Point Total | | | | | 9E-05 | | | | | 6E-01 |
| | Exposure Medium Total | | | | | | 9E-05 | | | | | 6E-01 |
| Medium Total | | | | | | | 9E-05 | | | | | 6E-01 |
| Ground Water | Potable Water | Exposure Unit 8 | ARSENIC | 2E-04 | -- | 9E-07 | 2E-04 | Hyperpigmentation (In); Vascular (V); PNS (N) | 9E-01 | -- | 4E-03 | 9E-01 |
| | | | IRON | -- | -- | -- | -- | Gastrointestinal effects | 2E+00 | -- | 8E-03 | 2E+00 |
| | | | THALLIUM | -- | -- | -- | -- | Hematological effects | 2E+00 | -- | 1E-02 | 2E+00 |
| | | | HIGHLY CHLORINATED PCBs | 2E-06 | -- | -- | 2E-06 | Ocular exudate (OC), inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody (IgG and IgM) response to sheep erythrocytes | 1E-01 | -- | -- | 1E-01 |
| | | | 4,4'-DDD | 2E-07 | -- | 2E-06 | 2E-06 | -- | -- | -- | -- | -- |
| | | | 4,4'-DDT | 4E-06 | -- | 5E-05 | 6E-05 | Liver lesions (H) | 6E-02 | -- | 7E-01 | 8E-01 |
| | | | ALDRIN | 7E-06 | -- | 6E-07 | 7E-06 | Liver toxicity (H) | 3E-02 | -- | 3E-03 | 3E-02 |
| | | | ALPHA-BHC | 1E-05 | -- | -- | 1E-05 | -- | -- | -- | -- | -- |
| | | | HEPTACHLOR EPOXIDE | 1E-06 | -- | -- | 1E-06 | Increased liver-to-body weight ratio in males and females (H) | 2E-02 | -- | -- | 2E-02 |
| | | | 2,4-DIMETHYLPHENOL | -- | -- | -- | -- | Clinical signs (lethargy, prostration, and ataxia) and hematological changes (B) | 6E+00 | -- | 8E-01 | 6E+00 |
| | | | 2-METHYLNAPHTHALENE | -- | -- | -- | -- | Pulmonary alveolar proteinosis | 4E+00 | -- | -- | 4E+00 |
| | | | 3&4-METHYLPHENOL | -- | -- | -- | -- | Decreased body weight and neurotoxicity | 2E+00 | -- | 2E-01 | 3E+00 |
| | | | 4-METHYLPHENOL | -- | -- | -- | -- | -- | 5E+00 | -- | 4E-01 | 5E+00 |
| | | | BENZ(A)ANTHRACENE | 5E-04 | -- | 6E-03 | 6E-03 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 2E-03 | -- | 4E-02 | 4E-02 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 2E-04 | -- | 4E-03 | 4E-03 | -- | -- | -- | -- | -- |
| | | | BENZO(K)FLUORANTHENE | 2E-05 | -- | -- | 2E-05 | -- | -- | -- | -- | -- |

TABLE 7.13 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| | | | BIS(2-ETHYLHEXYL)PHTHALATE | 2E-06 | -- | 3E-06 | 4E-06 | Increased relative liver weight (H) | 1E-02 | -- | 2E-02 | 4E-02 |
| | | | CHRYSENE | 3E-06 | -- | 4E-05 | 4E-05 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 2E-04 | -- | 8E-03 | 8E-03 | -- | -- | -- | -- | -- |
| | | | DIBENZOFURAN | -- | -- | -- | -- | Reduced length and organ weight. Excess abdominal fat (O). | 5E+00 | -- | -- | 5E+00 |
| | | | HEXACHLOROBUTADIENE | 9E-07 | -- | 2E-06 | 3E-06 | -- | -- | -- | -- | -- |
| | | | INDENO(1,2,3-CD)PYRENE | 7E-05 | -- | 2E-03 | 2E-03 | -- | -- | -- | -- | -- |
| | | | NAPHTHALENE | -- | -- | -- | -- | Decreased body weight (W) | 5E+00 | -- | 4E+00 | 9E+00 |
| | | | PHENANTHRENE | -- | -- | -- | -- | -- | 4E-01 | -- | 1E+00 | 1E+00 |
| | | | 1,2,4-TRICHLOROBENZENE | 6E-07 | -- | 8E-07 | 1E-06 | Increased adrenal weights; vacuolization of zona fasciculata in the cortex | 4E-02 | -- | 5E-02 | 9E-02 |
| | | | 1,4-DICHLOROBENZENE | 3E-05 | -- | 2E-05 | 5E-05 | Liver | 2E-01 | -- | 1E-01 | 3E-01 |
| | | | BENZENE | 4E-03 | -- | 6E-04 | 4E-03 | Reduced lymphocyte count | 4E+01 | -- | 6E+00 | 5E+01 |
| | | | BROMODICHLOROMETHANE | 2E-06 | -- | 2E-07 | 2E-06 | Renal cytomegaly (R) | 4E-03 | -- | 3E-04 | 4E-03 |
| | | | TETRACHLOROETHENE | 2E-06 | -- | 1E-06 | 3E-06 | Hepatotoxicity in mice (H), weight gain in rats | 8E-04 | -- | 5E-04 | 1E-03 |
| | | | VINYL CHLORIDE | 1E-05 | -- | 5E-07 | 1E-05 | Liver cell polymorphism (H) | 1E-02 | -- | 5E-04 | 1E-02 |
| | | | Chemical Total | 7E-03 | -- | 6E-02 | 6E-02 | | 7E+01 | -- | 1E+01 | 9E+01 |
| | | Exposure Point Total | | | | | 6E-02 | | | | | 9E+01 |
| | Exposure Medium Total | | | | | | 6E-02 | | | | | 9E+01 |
| | Shower Vapor | Exposure Unit 8 | 1,2,4-TRIMETHYLBENZENE | -- | -- | -- | -- | Hematological and Pulmonary | -- | 1E+01 | -- | 1E+01 |
| | | | 1,2-DICHLOROBENZENE | -- | -- | -- | -- | -- | -- | 1E+00 | -- | 1E+00 |
| | | | 1,4-DICHLOROBENZENE | -- | 6E-04 | -- | 6E-04 | Liver | -- | 2E-01 | -- | 2E-01 |
| | | | BENZENE | -- | 5E-03 | -- | 5E-03 | Decreased lymphocyte count | -- | 5E+01 | -- | 5E+01 |
| | | | BROMODICHLOROMETHANE | -- | 1E-05 | -- | 1E-05 | -- | -- | -- | -- | -- |
| | | | CHLOROFORM | -- | 3E-05 | -- | 3E-05 | Hepatic effects | -- | 3E-02 | -- | 3E-02 |
| | | | XYLENES, TOTAL | -- | -- | -- | -- | Impaired motor coordination (decreased rotarod performance) | -- | 2E+00 | -- | 2E+00 |
| | | | Chemical Total | -- | 6E-03 | -- | 6E-03 | | -- | 7E+01 | -- | 7E+01 |
| | | Exposure Point Total | | | | | 6E-03 | | | | | 7E+01 |
| | Exposure Medium Total | | | | | | 6E-03 | | | | | 7E+01 |
| Medium Total | | | | | | | 7E-02 | | | | | 2E+02 |
| Receptor Total | | | | | | | 7E-02 | | | | Receptor HI Total | 2E+02 |

| | |
|---|---|
| Total Risk Across All Media = | 7E-02 |
| Total Hazard Across All Media = | 2E+02 |
| Total Liver HI Across All Media = | 1E+00 |
| Total Kidney HI Across All Media = | 9E-02 |
| Total Nervous System Effects HI Across All Media = | 1E+01 |
| Total Lymphocyte Effects HI Across All Media = | 1E+02 |
| Total Nasal/Respiratory Effects HI Across All Media = | 2E+01 |
| Total Ocular Effects HI Across All Media = | 2E-01 |
| Total Other Effects HI Across All Media = | 3E+01 |

TABLE 7.13a RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HONEYWELL WASTEBED B/HARBOR BROOK SITE - GEDDES AND SYRACUSE, NEW YORK

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Chemical of Potential Concern | Carcinogenic Risk | | | | Non-Carcinogenic Hazard Quotient | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total | Primary Target Organ(s) | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| Surface Soil | Outdoor Air | Exposure Unit 9 | None | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | Chemical Total | -- | -- | -- | -- | | -- | -- | -- | -- |
| | | Exposure Point Total | | | | | -- | | | | | -- |
| | Exposure Medium Total | | | | | | -- | | | | | -- |
| Medium Total | | | | | | | -- | | | | | -- |
| Soil | Surface Soil | Exposure Unit 9 | 2,3,7,8-TCDD Equivalent | 1E-06 | -- | 3E-07 | 2E-06 | -- | 2E-02 | -- | 5E-03 | 3E-02 |
| | | | ARSENIC | 3E-06 | -- | 7E-07 | 3E-06 | Hyperpigmentation (In); Vascular (V); PNS (N) | 1E-02 | -- | 3E-03 | 2E-02 |
| | | | HIGHLY CHLORINATED PCBs | 5E-07 | -- | 6E-07 | 1E-06 | -- | 3E-02 | -- | 4E-02 | 7E-02 |
| | | | BENZ(A)ANTHRACENE | 2E-06 | -- | 2E-06 | 4E-06 | -- | -- | -- | -- | -- |
| | | | BENZO(A)PYRENE | 1E-05 | -- | 1E-05 | 3E-05 | -- | -- | -- | -- | -- |
| | | | BENZO(B)FLUORANTHENE | 2E-06 | -- | 2E-06 | 4E-06 | -- | -- | -- | -- | -- |
| | | | DIBENZ(A,H)ANTHRACENE | 1E-06 | -- | 1E-06 | 3E-06 | -- | -- | -- | -- | -- |
| | | | Chemical Total | 2E-05 | -- | 2E-05 | 5E-05 | | 7E-02 | -- | 4E-02 | 1E-01 |
| | | Exposure Point Total | | | | | 5E-05 | | | | | 1E-01 |
| | Exposure Medium Total | | | | | | 5E-05 | | | | | 1E-01 |
| Medium Total | | | | | | | 5E-05 | | | | | 1E-01 |
| Receptor Total | | | | | | | 5E-05 | | | | Receptor HI Total | 1E-01 |

Total Risk Across All Media = 5E-05

Total Hazard Across All Media = 1E-01

**COST ESTIMATE SUMMARY**

**TABLE 8. ALTERNATIVE 3 COST ESTIMATE - Enhanced Engineered Cover System with Wetland Construction/Restoration**

Site: Honeywell Wastebed B / Harbor Brook Site
Location: Geddes, NY
Base Year: 2017

Conceputal Basis:
Enhanced Engineered cover over remaining Lakeshore Areas (min. 1-ft, up to 2-ft)
1-ft Engineered cover and Veg Enhancement over AOS 2, Penn-Can Area, and Railroad Area.
Wetland construction/restoration with Low-Perm Cover
Continued Operation and Maintenance of IRMs

| ITEM | UNIT | ESTIMATED QUANTITY | ESTIMATED UNIT COST | ESTIMATED COST | | NOTES |
|---|---|---|---|---|---|---|
| **Direct Capital Costs** | | | | | | |
| General Conditions | WK | 57 | $18,000 | $1,026,000 | | Trailer, fuel, small tools, consumables and safety |
| Air Monitoring | WK | 57 | $4,250 | $242,250 | | |
| Surveys | WK | 57 | $3,000 | $171,000 | | During capping |
| Irrigation | WK | 8 | $5,000 | $40,000 | | Following seeding; 4 wks per season |
| Environmental Easement | LS | 1 | $30,000 | $30,000 | | |
| Site Management Plan | LS | 1 | $50,000 | $50,000 | | |
| | | | | **Item Subtotal (rounded):** | **$1,559,000** | |
| **Pre-Design Investigation** | | | | | | |
| Existing Cover thickness | LS | 1 | $150,000 | $150,000 | | Lake Support Area (Lakeshore), Staging area (Penn-Can), AOS#1 and #2 |
| DNAPL delineation | LS | 1 | $60,000 | $60,000 | | 2 observation wells and 5 probes |
| | | | | **Item Subtotal (rounded):** | **$210,000** | |
| **Site Preparation** | | | | | | |
| Clearing and Grubbing | AC | 10.7 | $2,600 | $27,820 | | Railroad and portions Penn-Cann areas exclusive of IRM footprints and Veg Enhancement Areas |
| Rough Grading | AC | 43.4 | $3,000 | $130,200 | | All areas except IRM (Railroad and Penn-Can) and Vegetation Enhancement Areas |
| | | | | **Item Subtotal (rounded):** | **$158,000** | |
| **QA/QC** | | | | | | |
| Materials QA/QC Testing - Topsoil | EA | 51 | $500 | $25,491 | | 1/500 cy of imported materials |
| Materials QA/QC Testing - Fill and Stone | EA | 113 | $400 | $45,306 | | 1/500 cy of imported materials |
| Performance QA/QC - Compaction | WK | 57 | $1,200 | $68,400 | | |
| | | | | **Item Subtotal (rounded):** | **$139,000** | ` |
| **Engineered Cover, Enhanced - Lakeshore Area** | | | | | | *For purposes of cost estimating enhanced cover = 50% each of 1-ft and 2-ft thickness* |
| Erosion and Sediment Control | LF | 8,790 | $4.00 | $35,160 | | Reinforced silt fence; one replacement |
| Place Topsoil to 6-inch depth | CY | 16,859 | $58 | $977,841 | | Placement by conventional equipment in 6-inch lifts |
| Place Imported Fill up to 18-inch depth | CY | 33,719 | $43 | $1,449,903 | | Buffer layer; placement by conventional equipment in 6-inch lifts; varies 6 to 18 inches |
| Place Imported Granular Stone to 1-ft depth | CY | 3,796 | $37 | $140,458 | | stone fill overlying geogrid; approx 2.5 acres in addition to soil cover |
| Place Clay Fill to 12-inches | CY | 3,227 | $50 | $161,333 | | below engineeered cover layers for areas below El. 365 (high lake level); approx. 2 acres assumed |
| Seeding | AC | 20.9 | $18,000 | $376,200 | | Modified old field successional with fertilizer; applied by hydroseeding |
| | | | | **Item Subtotal (rounded):** | **$3,141,000** | ` |
| **Constructed Wetland, 2.5-ft - Lakeshore Area** | | | | | | |
| Erosion and Sediment Control | LF | 200 | $4.00 | $800 | | Reinforced silt fence |
| Excavation | CY | 850 | $9.25 | $7,863 | | to 4-ft bgs along northwest corner of Lakeshore Area |
| Grade and Place Onsite | CY | 850 | $4 | $3,400 | | place and grade on western portion of Lakeshore prior to 2-ft capping |
| Place and plant Constructed Wetland | AC | 1.0 | $450,000 | $450,000 | | topsoil, subgrade fill, LLDPE/geofabric and carp gate |
| Place buffer and engineered layers | AC | 1.2 | $75,000 | $90,000 | | 6-inch subgrade fill, LLDPE/geofabric adjacent to wetland footprint |
| | | | | **Item Subtotal (rounded):** | **$552,000** | |
| **Vegetate Existing Fill - Lakeshore, Lake Support Area** | | | | | | |
| Rip, disc and till existing soils | AC | 8.1 | $6,000 | $48,600 | | prepare existing Lake support area grade for planting |
| Hydromulch installation | CY | 2,700 | $65 | $175,500 | | Mulch/Seed placement by blown-in methods; 2.5 inch thickness assumed over 8.1 acres |
| | | | | **Item Subtotal (rounded):** | **$224,000** | |

## COST ESTIMATE SUMMARY

**TABLE 8. ALTERNATIVE 3 COST ESTIMATE - Enhanced Engineered Cover System with Wetland Construction/Restoration**

Site: Honeywell Wastebed B / Harbor Brook Site
Location: Geddes, NY
Base Year: 2017

Conceputal Basis:
Enhanced Engineered cover over remaining Lakeshore Areas (min. 1-ft, up to 2-ft)
1-ft Engineered cover and Veg Enhancement over AOS 2, Penn-Can Area, and Railroad Area.
Wetland construction/restoration with Low-Perm Cover
Continued Operation and Maintenance of IRMs

| ITEM | UNIT | ESTIMATED QUANTITY | ESTIMATED UNIT COST | ESTIMATED COST | | NOTES |
|---|---|---|---|---|---|---|
| **Vegetate Existing Fill - Upper East Flume IRM Restoration** | | | | | | |
| Rip, disc and till existing soils | AC | 3.0 | $6,000 | $18,000 | | prepare existing Lake support area grade for planting |
| Hydromulch installation | CY | 1,000 | $65 | $65,000 | | Mulch/Seed placement by blown-in methods; 2.5 inch thickness assumed over 3 acres acres |
| | | | | Item Subtotal (rounded): | $83,000 | |
| **Engineered Cover (Soil), 1-ft - Penn-Can Area** | | | | | | |
| Erosion and Sediment Control | LF | 500 | $4.00 | $2,000 | | Reinforced silt fence; one replacement |
| Place Topsoil to 6-inch depth | CY | 323 | $58 | $18,715 | | Placement by conventional equipment in 6-inch lifts |
| Place Imported Fill to 6-inch depth | CY | 323 | $43 | $13,875 | | Placement by conventional equipment in 6-inch lifts |
| Seeding | AC | 0.4 | $18,000 | $7,200 | | Modified old field successional with fertilizer; applied by hydroseeding |
| | | | | Item Subtotal (rounded): | $41,789 | |
| **Engineered Cover (Granular), 1-ft - Penn-Can Area** | | | | | | |
| Erosion and Sediment Control | LF | 2,000 | $4.00 | $8,000 | | Reinforced silt fence; one replacement |
| Place Subgrade stone to 12-inches | CY | 10,486.7 | $35 | $367,033 | | |
| Geogrid stabilization | AC | 6.5 | $43,560.00 | $283,140 | | assume $1/sf installed |
| LLDPE Liner and Geofabric | SF | 65,340 | $2 | $104,544 | | 40 mil LLDPE and single layer geofabric; 1.5 acre assumed |
| Geocushion | SF | 65,340 | $0.50 | $32,670 | | 1.5 acre assumed |
| | | | | Item Subtotal (rounded): | $795,000 | |
| **Vegetated Enhancement - Penn-Can Area** | | | | | | |
| Erosion and Sediment Control | LF | 1,800 | $4.00 | $7,200 | | Reinforced silt fence; one replacement |
| Hydromulch installation | CY | 500 | $65 | $32,500 | | Mulch/Seed placement by blown-in methods; 2.5 inch thickness assumed over 1.5 acres acres |
| | | | | Item Subtotal (rounded): | $40,000 | |
| **Engineered Cover, 1-ft - Railroad Area** | | | | | | |
| Erosion and Sediment Control | LF | 8,640 | $4.00 | $34,560 | | Reinforced silt fence; one replacement |
| Provide Railroad Flagman | DA | 26 | $1,800 | $45,938 | | |
| Place Topsoil to 6-inch depth | CY | 8,309 | $58 | $481,903 | | Placement by conventional equipment in 6-inch lifts |
| Place Imported Fill to 6-inch depth | CY | 8,309 | $43 | $357,273 | | Placement by conventional equipment in 6-inch lifts |
| Seeding | AC | 10.3 | $18,000 | $185,400 | | Modified old field successional with fertilizer; applied by hydroseeding |
| | | | | Item Subtotal (rounded): | $1,105,000 | |
| **Vegetated Enhancement - Railroad Area and AOC #2** | | | | | | |
| Erosion and Sediment Control | LF | 1,700 | $4.00 | $6,800 | | Reinforced silt fence; one replacement |
| Provide Railroad Flagman | DA | 3 | $1,800 | $5,891 | | |
| Hydromulch installation | CY | 1,100 | $65 | $71,500 | | Mulch/Seed placement by blown-in methods; 2.5 inch thickness assumed over 3.2 acres acres |
| | | | | Item Subtotal (rounded): | $84,000 | |
| **Monitoring Wells** | | | | | | |
| Install DNAPL Monitoring Well | VLF | 280 | $150 | $42,000 | | 2-inch fiberglass to 70-ft; 4 wells total |
| | | | | Item Subtotal (rounded): | $42,000 | |

| | | |
|---|---|---|
| **TOTAL ESTIMATED DIRECT CAPITAL COST (rounded):** | **$8,173,789** | |
| **ENGINEERING/MANAGMENT, CONSTRUCTION OVERSIGHT, OBG OH&P** | **$1,553,020** | 6%, 8%, and 5% respectively |
| **CONTINGENCY (25%)** | **$2,043,447** | Scope Contingency |
| **TOTAL ESTIMATED CAPITAL COST (rounded):** | **$11,800,000** | |

**COST ESTIMATE SUMMARY**

**TABLE 8. ALTERNATIVE 3 COST ESTIMATE - Enhanced Engineered Cover System with Wetland Construction/Restoration**

Site: Honeywell Wastebed B / Harbor Brook Site
Location: Geddes, NY
Base Year: 2017

Conceputal Basis:
Enhanced Engineered cover over remaining Lakeshore Areas (min. 1-ft, up to 2-ft)
1-ft Engineered cover and Veg Enhancement over AOS 2, Penn-Can Area, and Railroad Area.
Wetland construction/restoration with Low-Perm Cover
Continued Operation and Maintenance of IRMs

| ITEM | UNIT | ESTIMATED QUANTITY | ESTIMATED UNIT COST | ESTIMATED COST | NOTES |
|---|---|---|---|---|---|
| **Operation and Maintenance Costs** | | | | | |
| **Annual (Years 1-30)** | | | | | |
| Reporting and Recordkeeping | EA | 1 | $20,000 | $20,000 | |
| Cover inspection | LS | 1 | $12,480 | $12,480 | Assumes 2 scientists/engineers, 4 days, 8 hours/day, semi-annual inspections, inc. wetland |
| Cap Maintenance | | | | | |
| Vegetation Maintenance | AC | 7.7 | $3,000 | $23,160 | Spot seeding; 10% of all areas annually |
| Soil Cover maintenance and incidental repairs | AC | 48.4 | $225 | $10,890 | Topsoil repair, 5 cy per acre annually |
| Groundwater Monitoring | | | | | |
| Sampling Labor | LS | 1 | $1,600 | $1,600 | |
| DNAPL and Water Level Monitoring | LS | 1 | $1,600 | $1,600 | |
| Upper Harbor Brook | | | | | |
| Pump Stations Operation and Oversight | LS | 1 | $7,000 | $7,000 | Labor for operation of Pump Station #1 and #2 |
| Routine maintenance - Labor | LS | 1 | $71,600 | $71,600 | Grounds maintenance, acid addition, value cleaning, well lancing |
| Maintenance - parts | LS | 1 | $11,500 | $11,500 | Pump, compressor and major system repairs |
| Electrical Power | LS | 1 | $1,500 | $1,500 | |
| Upper Harborbrook Collection Systems WWTP operation (i | gal | 19,972,800 | 0.0064 | $127,009 | Based on 38 gpm annual average for the Upper Harborbrook Collection System |
| Lakeshore Collection System - East and West Walls | | | | | |
| Lift Station Operation and Oversight | LS | 1 | $7,000 | $7,000 | operation and monitoring |
| Routine maintenance - Labor | LS | 1 | $68,000 | $68,000 | Grounds maintenance, acid addition, value cleaning, well lancing |
| Maintenance - parts | LS | 1 | $7,200 | $7,200 | Pump, compressor and major system repairs |
| Electrical Power | LS | 1 | $4,200 | $4,200 | |
| East/West Wall WWTP operation (incremental) | gal | 33,112,800 | 0.0064 | $210,568 | Based on 63 gpm annual average contribution from West Wall Hydraulic Containment System |
| **Annual (Years 1-5)** | | | | | |
| Wetland Invasives Control | LS | 1 | $3,500 | $3,500 | hand pulling invasives; 2 scientists, 1 day, 8 hours/day |
| Wetland Plantings Replacement | LS | 1 | $2,500 | $2,500 | replacement of non-surviving plantings; assume 5% of area per year |
| **Years 5, 10, 15, 20, 25, 30** | | | | | |
| Five Year Review | EA | 1 | $15,000 | $15,000 | |

| **Present Worth Analysis Years (1-30)** Cost Type | Cost | Discount Factor Df=7 | **Present Worth ($) (rounded)** | |
|---|---|---|---|---|
| Capital Cost - Year 0 | $11,800,000 | 1.00 | **$11,800,000** | |
| Annual O&M - Years 1-5 | $591,307 | 0.82 | **$2,424,000** | Average discount factor for years 1-5 |
| Annual O&M - Years 6-30 | $585,307 | 0.33 | **$4,863,000** | Average discount factor for years 6-30 |
| Periodic O&M - Years 5, 10, 15, 20, 25, 30 | $15,000 | 0.36 | **$32,000** | Average discount factor for years 5, 10, 15, 20, 25 and 30 |
| **TOTAL PRESENT WORTH ESTIMATED ALTERNATIVE COST (rounded):** | | | **$19,119,000** | |

**TABLE 9. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND TO BE CONSIDERED (TBC) MATERIALS**

| Medium/Location/Action | Citation | Requirements | Comments |
|---|---|---|---|
| **Chemical-Specific ARARs and TBCs** | | | |
| Groundwater | 6 NYCRR 700.1 - Definitions | Promulgated state regulation that provides groundwater definitions. | Fresh groundwater is defined as groundwater with a chloride concentration equal to or less than 250 mg/L or a total dissolved solids concentration (TDS) equal to or less than 1,000 mg/L. Saline groundwater is defined as groundwater with a chloride concentration greater than 250 mg/L or a TDS concentration greater than 1,000 mg/L. |
| | 6 NYCRR 701 - Classifications - Surface Waters and Groundwaters | Promulgated state regulation that provides groundwater classifications. | 6 NYCRR Part 701.15 states that Class GA groundwater is fresh groundwater, and the best use of Class GA groundwater is potable use. 6 NYCRR Part 701.16 states that Class GSA groundwater is saline groundwater, and the best use of Class GSA groundwater is as a source of potable mineral waters, conversion to fresh potable waters, or as raw material for the manufacture of sodium chloride or its derivatives or similar products. 6 NYCRR Part 701.18 states that the groundwater classifications defined in Sections 701.15 (Class GA fresh groundwaters) and 701.16 (Class GSA saline groundwaters) are assigned to all the groundwaters of New York State. The Class GSB shall not be assigned to any groundwater of the State, unless the commissioner finds that adjacent and tributary groundwaters and the best usages thereof will not be impaired by such classification. |
| Shallow/intermediate groundwater | 6 NYCRR Part 703 - Class GA groundwater quality standards | Promulgated water quality standards for fresh groundwater, including narrative and constituent-specific standards. | Not applicable to shallow or intermediate groundwater within the limits of the Site due to the presence of Solvay waste, historic fill materials disposed of at the Site, coal tar-like DNAPL associated with the Penn-Can Property, and stained soils found in shallow fill material on the Lakeshore Area and AOS #1. Potentially applicable for shallow and intermediate groundwater beyond the limits of the Site boundary. |
| | 6 NYCRR Part 703 - Class GSA groundwater quality standards | Promulgated water quality standards for saline groundwater, consisting of narrative standards for taste-, color-, and odor-producing, and toxic and other deleterious substances, and thermal discharges. | Potentially applicable for saline groundwater. |
| | NYS TOGS 1.1.1 – Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations | Guidance that summarizes groundwater standards and guidance values. | Not applicable to shallow or intermediate groundwater within the limits of the Site due to the presence of Solvay waste, historic fill materials disposed of at the Site, coal tar-like DNAPL associated with the Penn-Can Property, and stained soils found in shallow fill material on the Lakeshore Area and AOS #1. Potentially applicable for shallow and intermediate groundwater beyond the limits of the Site boundary. |
| | 40 CFR Part 141 - Drinking Water Standards | Establishes Maximum Contaminant Levels (MCLs) for public water supplies. | Not applicable to shallow or intermediate groundwater within the limits of the Site due to the presence of Solvay waste, historic fill materials disposed of at the Site, coal tar-like DNAPL associated with the Penn-Can Property, and stained soils found in shallow fill material on the Lakeshore Area and AOS #1. Potentially applicable for shallow and intermediate groundwater beyond the limits of the Site boundary. Shallow and intermediate groundwater is not used as a drinking water source as municipal water is available, nor is it suitable for a drinking water source (due to salinity). |
| Soil/fill material | 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives (SCOs) | Promulgated state regulation that documents SCOs for various restricted property uses (industrial, commercial, restricted residential, and residential), for the protection of groundwater and ecological resources, and for unrestricted property use. Commercial use includes passive recreational use that refers to recreational uses with limited potential for soil contact, such as: (1) artificial surface fields; (2) outdoor tennis or basketball courts; (3) other paved recreational facilities used for roller hockey, roller skating, shuffle board, etc.; (4) outdoor pools; (5) indoor sports or recreational facilities; (6) golf courses; and (7) paved (raised) bike or walking paths (DER-10 (NYSDEC 2010)). Industrial use includes land use for the primary purpose of manufacturing, production, fabrication or assembly processes and ancillary services. The industrial use category allows the use of the site only for industrial purposes with access to the site limited to workers and occasional visitors [DER-10 (NYSDEC 2010)]. | SCOs for restricted use (industrial, commercial) are potentially relevant and appropriate to site soil/fill material given the current and reasonably anticipated future land use as a commercial or industrial property. SCOs for the protection of groundwater may not be applicable, relevant or appropriate because migration of Site groundwater is currently being controlled. SCOs for unrestricted use may not be applicable, relevant or appropriate given the current and reasonably anticipated future land use of the Site; however, were considered for the purpose of evaluating pre-disposal conditions. |
| | USEPA Soil Screening Guidance: User's Guide (1996) | Guidance that provides methodology for developing site-specific soil screening levels. Also provides generic soil screening levels based on default assumptions. | Potentially relevant and appropriate to Site soil. |
| | USEPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination (1990) | Guidance that describes recommended approach to evaluate and remediate sites with PCB contaminations | Potentially applicable to PCBs in Site soil. |
| | USEPA Regional Screening Levels | Guidance that provides human health risk-based screening values for soil at industrial sites. Screening levels are calculated based on human health exposure assumptions and toxicity data. | Industrial soil screening levels are potentially applicable for the screening of soil/fill material. |
| | USEPA Ecological Screening Levels | Guidance that provides ecological risk-based screening values. Screening values are based on ecological exposure assumptions and toxicity data. | To be considered. Ecological screening values are not promulgated cleanup levels. |

**TABLE 9. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND TO BE CONSIDERED (TBC) MATERIALS**

| Medium/Location/Action | Citation | Requirements | Comments |
|---|---|---|---|
| **Location-Specific ARARs and TBCs** | | | |
| Construction of Buildings/Indoor Air | NYSDOH's October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York | Guidance document that provides thresholds for indoor air and subslab soil vapor above which vapor mitigation is required. | Not currently applicable, because no occupied buildings are present on the Site. Potentially applicable if future buildings are constructed at the Site. |
| | OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air, OSWER Publication 9200.2-154, June 2015 | Technical guidance that provides recommendations on assessment of vapor intrusion pathways that pose an unacceptable risk to human health. | Not currently applicable, because no occupied buildings are present on the Site. Potentially applicable if future buildings are constructed at the Site. |
| Water Bodies | 33 CFR 320 - 330 - Navigation and Navigable Waters | Regulatory policies and permit requirements for work affecting waters of the United States and navigable waterways. | Substantive, non-administrative requirements potentially applicable to work affecting Harbor Brook or Onondaga Lake. |
| | 16 USC 661 - Fish and Wildlife Coordination Act | Requires protection of fish and wildlife in a stream or other water body when performing activities that modify a stream or river. | |
| Wetlands | 6 NYCRR 663 - Freshwater wetland permit requirements | Actions occurring in a designated freshwater wetland (within 100 feet) must be approved by NYSDEC or its designee. Activities occurring adjacent to freshwater wetlands must: be compatible with preservation, protection, and conservation of wetlands and benefits; result in no more than insubstantial degradation to or loss of any part of the wetland; and be compatible with public health and welfare. | Potentially applicable to remedial actions within 100 ft of Site wetlands as designated freshwater wetland regulated by NYSDEC. |
| | Clean Water Act Section 404<br>33 CFR Parts 320 - 330 | Regulatory policies and permit requirements for work affecting waters of the United States, including wetlands. | Potentially applicable to Site wetlands. |
| | Clean Water Act Section 404<br>40 CFR Parts 230-231 | Provides for restoration and maintenance of integrity of waters of the United States, including wetlands, through the control of dredged or fill material discharge. | |
| | Executive Order 11990 - Protection of Wetlands | Executive order requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or loss of wetlands if a practical alternative exists. | |
| Wetlands & Floodplains | Policy on Floodplains and Wetland Assessments for CERCLA Actions (OSWER Directive 9280.0-2; 1985) | Policy and guidance requiring Superfund actions to meet substantive requirements of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands). Describes requirements for floodplain assessment during remedial action planning. | To be considered during the remedial design. Potentially applicable for Site wetlands. Potentially applicable as a portion of the Site is within the 100-year and 500-year floodplains. |
| | Statement of Procedures on Floodplains Management and Wetlands Protection (January 5, 1979) | Policy and guidance for implementing Executive Orders 11988 and 11990. Requires federal agencies to evaluate the potential effects of action proposed in wetlands and floodplains to avoid, to the extent possible, adverse effects. Federal agencies are required to evaluate alternatives to actions in wetlands and floodplains to avoid or minimize adverse impacts if no practical alternatives exist. | To be considered during the remedial design. Potentially applicable for Site wetlands. Potentially applicable as a portion of the Site is within the 100-year and 500-year floodplains. Requires a floodplain assessment if the selected alternative includes remedial activities that would potentially impact the floodplain. |
| Floodplains | Executive Order 11988 - Floodplain Management | USEPA is required to conduct activities to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupation or modification of floodplains. The procedures also require USEPA to avoid direct or indirect support of floodplain development wherever there are practicable alternatives and minimize potential harm to floodplains when there are no practicable alternatives. | Potentially applicable or relevant. The Site is located within a 100-year and 500-year floodplains. Requires a floodplain assessment if the selected alternative includes remedial activities that would potentially impact the floodplain. |
| | Executive Order 13690 - Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input | Executive order establishes a Federal Flood Risk Management Standard (FFRMS), a Process for Further Soliciting and Considering Stakeholder Input, and amends Executive Order 11988. The FFRMS establishes a construction standard and framework for Federally funded projects constructed in, and affecting, floodplains, to reduce the risks and cost of floods. Under the FFRMS, federal agency management is expanded from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk to increase resiliency of projects funded with federal funds. The Executive Order also sets forth a process for solicitation and consideration of public input, prior to implementation of the FFRMS. | Potentially applicable or relevant. The Site is located within a 100-year and 500-year floodplains. Requires a floodplain assessment if the selected alternative includes remedial activities that would potentially impact the floodplain. |
| | 6 NYCRR 500 - Floodplain Management Regulations Development Permits | Promulgated state regulations providing permit requirements for development in areas of special flood hazard (floodplain within a community subject to a one percent or greater chance of flooding in any given year). | Requires remedial activities to be conducted in accordance with the statutory requirements of the Town of Geddes Flood Protection Ordinance if conducted within the 100-year and/or 500-year floodplains as defined by FEMA. The 100-year and 500-year floodplains exist along the general lakeshore area immediately adjacent to Onondaga Lake and includes portions of Harbor Brook. |
| | Town of Geddes Flood Protection Ordinance | Permit requirements for work in areas of special flood hazard. | Requires remedial activities to be conducted in accordance with the statutory requirements of the Town of Geddes Flood Protection Ordinance if conducted within the 100-year and/or 500-year floodplains as defined by FEMA. The 100-year and 500-year floodplains exist along the general lakeshore area immediately adjacent to Onondaga Lake and includes portions of Harbor Brook. |
| Historical property or district | National Historic Preservation Act<br>36 CFR 800- Preservation of Historic Properties Owned by a Federal Agency | Remedial actions are required to account for the effects of remedial activities on any historic properties included on or eligible for inclusion on the National Register of Historic Places. | To be considered during remedial design. |
| | National Historic Preservation Act<br>36 CFR Part 65 - National Historic Landmarks Program | Promulgated federal regulation requiring that actions must be taken to preserve and recover historical/archeological artifacts found. | To be considered during remedial design. |
| | New York State Historic Preservation Act of 1980<br>9 NYCRR Parts 426 - 428 | State law and regulations requiring the protection of historic, architectural, archeological and cultural property. | To be considered during remedial design. |
| Protection of waters | 33 U.S.C. 1341 - Clean Water Act Section 401, State Water Quality Certification Program | States have the authority to veto or place conditions on federally permitted activities that may result in water pollution. | Potentially applicable to site wetlands. |

**TABLE 9. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND TO BE CONSIDERED (TBC) MATERIALS**

| Medium/Location/Action | Citation | Requirements | Comments |
|---|---|---|---|
| **Action-Specific ARARs and TBCs** | | | |
| Institutional controls | NYSDEC DER-33 Institutional Controls: A Guide to Drafting and Recording Institutional Controls, December 2010 | Technical guidance document that provides guidelines for proper development and recording of institutional controls as part of a site remedial program. | Potentially applicable TBC when institutional controls are implemented as a component of the selected remedy. |
| Cover systems | NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, May 2010 | Technical guidance document that provides guidelines for cover thicknesses as they relate to property use in areas where exposed surface soil exceeds NYCRR Part 375 SCOs. Specifically, where the exposed surface soil at the site exceeds the applicable soil cleanup objective for protection of human health and/or ecological resources, the soil cover for restricted residential use, is to be two feet; for commercial or industrial use, is to be one foot; or when an ecological resource has been identified is to be a minimum of two feet; and when such a concern is identified by NYSDEC, consideration should be given to supplementing the demarcation layer to serve as an impediment to burrowing. | Potentially applicable TBC for cover components of alternatives. |
| | RCRA Subtitle D, 40 CFR Part 258.60 - Closure Criteria | Regulations established under Subtitle D set federal closure requirements including installation of a final cover system that is designed to minimize infiltration and erosion, for owners and operators of municipal solid waste landfill units. | Potentially relevant and appropriate. Due to the presence of soil/fill material deposited at the Site, it is being considered a Waste Management Area for which closure criteria for final cover systems may be relevant. |
| Landfill | 40 CFR Part 257 - Criteria for Classification of Solid Waste Disposal Facilities and Practices | Promulgated federal regulation that provides criteria for solid waste disposal facilities to protect health and the environment. | Landfilling of wastes may be applicable for the Site. Potentially applicable for treatment residuals or soil/fill material consolidated on-Site in a containment unit. |
| | 40 CFR Parts 264 and 265, Subpart N - Landfills | Promulgated federal regulation that provides requirements for hazardous waste landfill units. | |
| Principal threat and low level threat wastes | A Guide to Principal Threat and Low Level Threat Wastes - Quick Reference Fact Sheet (OSWER Superfund Publication 9380.3-06FS, November 1991) | Guidance that outlines federal expectations, definitions, and documentation requirements related to waste considered principal or low level threat waste. | Potentially applicable TBC. |
| Generation and management of solid waste | 6 NYCRR 360 - Solid Waste Management Facilities | Promulgated state regulation that provides requirements for management of solid wastes, including disposal and closure of disposal facilities. | Potentially applicable to alternatives including disposal of residuals generated by treatment processes. |
| Land disposal | 6 NYCRR 376 - Land Disposal Restrictions | Promulgated federal and state regulations that provide treatment standards to be met prior to land disposal of hazardous wastes. | Potentially applicable to residuals generated by treatment processes if found to be hazardous wastes and disposed at a landfill. Applicable for off-site treatment and disposal of soil/fill material. |
| | 40 CFR Part 268 - Land Disposal Restrictions | | |
| | 62 CFR 25997 - Phase IV Supplemental Proposal on Land Disposal of Mineral Processing Wastes | | |
| Green remediation | NYSDEC DER-31 Green Remediation Program Policy, January 2011 | State and federal technical guidance documents that provide guidelines for the development of site remediation strategies in a manner that minimizes environmental impacts and applies green remediation concepts (*e.g.,* reduction in green house gas emissions, energy consumption and resource use, promotion of recycling of materials and conservations of water, land and habitat). | Potentially applicable TBC. |
| | Superfund Green Remediation Strategy, September 2010 | | |
| General excavation | 6 NYCRR 200-203, 211-212 - Prevention and Control of Air Contamination and Air Pollution | Provides requirements for air emission sources. | Portions potentially applicable to volatile emissions during excavation |
| | 6 NYCRR 257 - Air Quality Standards | Promulgated state regulation that provides specific limits on generation of $SO_2$, particulates, $CO_2$, photochemical oxidants, hydrocarbons (non-methane), $NO_2$, fluorides, beryllium and $H_2S$ from point sources. | Not applicable or relevant and appropriate. Dust emissions would not be generated from a point source. Potential TBC during dust generating activities such as earth moving, grading and excavation. |
| | 40 CFR Part 50.1 - 50.12 - National Ambient Air Quality Standards | Promulgated federal regulation that provides air quality standards for pollutants considered harmful to public health and the environment. The six principle pollutants are carbon monoxide, lead, nitrogen dioxide, particulates, ozone, and sulfur oxides. | Potentially applicable to alternatives during which dust generation may result, such as during earth moving, grading, and excavation. |
| | NYS TAGM 4031 - Dust Suppressing and Particle Monitoring at Inactive Hazardous Waste Disposal Sites | State guidance document that provides limitations on dust emissions. | To be considered material where more stringent than air-related ARARs. |

**TABLE 9. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND TO BE CONSIDERED (TBC) MATERIALS**

| Medium/Location/Action | Citation | Requirements | Comments |
|---|---|---|---|
| **Action-Specific ARARs and TBCs (continued)** | | | |
| Discharge to surface water and injection to groundwater | 6 NYCRR 750 through 758 - State Pollutant Discharge Elimination System (SPDES) Regulations | Substantive requirements associated with discharge to a water body (limitations and monitoring requirements) would be set by NYSDEC. | Treated groundwater recovered by IRM groundwater collection systems would be treated by the Willis-Semet Groundwater Treatment Plant, with subsequent discharge to the Onondaga County Department of Water Environment Protection Metro Wastewater Treatment Plan or directly to Onondaga Lake. |
| | 6 NYCRR 701 - Classifications- Surface Waters and Groundwaters | Promulgated state regulation that establishes classifications of surface water and groundwater in New York State. Provides general condition that discharges shall not cause impairment of the best usages of the receiving water as specified by the water classifications at the location of discharge and at other locations that may be affected by such discharge. Also establishes that groundwater classifications apply to all groundwaters of the state. | Potentially applicable. |
| | 6 NYCRR 703 - Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations | Promulgated state regulation that provides water quality standards for surface water and groundwater. Also provides Maximum Allowable Concentrations for discharge to Class GA groundwaters of the state. | Potentially applicable. |
| | 40 CFR 136 - Guidelines Establishing Test Procedures for The Analysis Of Pollutants | Federal guidance providing test procedures for NPDES programs. | Potentially applicable. |
| Discharge to publicly owned treatment works (POTW) | Clean Water Act Pretreatment Regulations (40 CFR Part 403) | Pretreatment requirements for discharges to POTWs. | Potentially applicable for treated groundwater discharged to the Onondaga County Metropolitan Wastewater Treatment Plant from the Willis-Semet Groundwater Treatment Plant. |
| Construction storm water management | NYSDEC General permit for storm water discharges associated with construction activities. Pursuant to Article 17 Titles 7 and 8 and Article 70 of the Environmental Conservation Law. | The regulation prohibits discharge of materials other than storm water and all discharges that contain a hazardous substance in excess of reportable quantities established by 40 CFR 117.3 or 40 CFR 302.4, unless a separate NPDES permit has been issued to regulate those discharges. A permit must be acquired if activities involve disturbance of 5 acres or more. If the project is covered under the general permit, the following are required: development and implementation of a storm water pollution prevention plan; development and implementation of a monitoring program; all records must be retained for a period of at least 3 years after construction is complete. | Potentially applicable. Construction could result in clearing/disturbance of more than 5 acres. |
| Transportation | 6 NYCRR 364 - Waste Transporter Permits | Promulgated state regulation requiring that hazardous waste transport must be conducted by a hauler permitted under 6 NYCRR 364. | Potentially applicable for off-site transport of hazardous waste. |
| | 49 CFR 107, 171-174 and 177-179 - Department of Transportation Regulations | Promulgated federal regulation requiring that hazardous waste transport to off-site disposal facilities must be conducted in accordance with applicable Department of Transportation requirements. | Potentially applicable for off-site transport of hazardous waste to off-site treatment/disposal facilities. |

ARARs - Applicable or Relevant and Appropriate Requirements
CERLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR - Code of Federal Regulations
DER - Division of Environmental Remediation
FEMA - Federal Emergency Management Agency
FS - Feasibility Study
mg/L - milligrams per liter
NYCRR - New York Code of Rules and Regulations
NYS - New York State
NYSDEC - New York State Department of Environmental Conservation
NYSDOH - New York State Department of Environmental Conservation
OSHA - Occupational Safety and Health Administration
OSWER - Office of Solid Waste and Emergency Response
PCB - Polychlorinated biphenyls
SCOs - Soil Cleanup Objectives
TAGM - Technical and Administrative Guidance Memorandum (NYSDEC)
TBC - To be Considered
USC - United States Code
USEPA or EPA - United States Environmental Protection Agency

**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX III**

**ADMINISTRATIVE RECORD INDEX**

**Administrative Record Index**
**Wastebed B/ Harbor Brook Site**

(New York State Inactive Hazardous Waste Disposal Site #7-34-075)

| RI/FS Activities | Documents |
|---|---|
| Remedial Investigation/Feasibility Study Work Plans | Citizen Participation Plan for the Onondaga Lake National Priority List Site (1996)<br><br>Wastebed B/Harbor Brook RI/FS Work Plan (September 2002) |
| Remedial Investigation Reports | Wastebed B/Harbor Brook Human Health Risk Assessment (October 2009)<br><br>Wastebed B/Harbor Brook Baseline Ecological Risk Assessment (August 2011)<br><br>Wastebed B/Harbor Brook Revised Remedial Investigation Report (March 2015) |
| Feasibility Study | Wastebed B/Harbor Brook Revised Final Feasibility Study Report (July 2018) |
| Documents Related to IRM Activities | Wastebed B/Harbor Brook IRM Consent Order (December 2003)<br><br>Wastebed B/Harbor Brook IRM Work Plan (July 2004)<br><br>Cultural Resource Management Report Phase 1B Archaeological Work Plan: Onondaga Lake Project, Upland and Shoreline Area, Wastebed 13, Geddes Brook IRM, Tributary of Geddes Brook, Ninemile Creek RI/FS, Shoreline Survey, and Wastebed B/Harbor Brook IRM (October 2009)<br><br>Response Action Document for the Wastebed B/Harbor Brook Site East Wall IRM (May 2011)<br><br>Cultural Resource Management Report Phase 1B Reconnaissance/Survey Onondaga Lake Project, Upland and Shoreline Area, Wastebed B/Harbor Brook IRM (February 2011) |

| | |
|---|---|
| | Response Action Document for the Wastebed B/Harbor Brook Site Outboard Area IRM (March 2012)<br><br>Wastebed B/Harbor Brook West Wall IRM Construction Work Plan (March 2014)<br><br>Wastebed B/Harbor Brook East Wall IRM Construction Work Plan (May 2014)<br><br>Wastebed B/Harbor Brook Upper IRM Construction Work Plan (September 2014)<br><br>Wastebed B 2015 Construction Activities Construction Completion Report (August 2018) |
| Proposed Plan Released<br><br>Start of Public Comment Period | Proposed Plan (July 25, 2018)<br><br>Notice of Public Meeting and Opportunity to Comment (July 26, 2018) |
| Public Meetings Held | Documentation and Transcript of August 16, 2018 Public Meeting (Attached to the Record of Decision as Appendix E)<br><br>Written Comments on Selected Remedy (Attached to the Record of Decision as Appendix E) |
| Record of Decision Issued | Record of Decision and Responses to Comments (Responsiveness Summary) – September 28, 2018 |
| Enforcement Documents | Wastebed B/Harbor Brook Consent Order (April 2000) |

**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX IV**

**NEW YORK STATE DEPARTMENT OF HEALTH LETTER OF CONCURRENCE**

July 20, 2018

Michael Ryan, Director
Division of Environmental Remediation
NYS Dept. of Environmental Conservation
625 Broadway
Albany, New York 12233

Re: **Proposed Plan**
Wastebed B / Harbor Brook
Site #734075
Geddes, Onondaga County

Dear Mr. Ryan:

At your Department's request, we have reviewed the NYSDEC and US EPA's *Proposed Plan* for the referenced site to determine whether the selected remedy is protective of public health. The Wastebed B / Harbor Brook site is a subsite of the Onondaga Lake Superfund Site. I understand that human exposures to contamination associated with this site will be addressed by the remedy as follows:

- Soil: A site cover system will be required to allow for commercial use of the site in accordance with 6 NYCRR Part 375. Use and development of the site will be limited to commercial and industrial uses. Future excavations at the site will be conducted in accordance with an approved excavation plan to properly manage human exposures to remaining contaminated soil.

- Groundwater: Use of groundwater at the site without prior approval will be restricted by environmental easements and/or restrictive covenants placed on the site.

- Soil Vapor: A soil vapor intrusion evaluation will be completed, and appropriate actions implemented, for any buildings developed on the site.

Periodic reviews will be completed to certify that these elements of the remedy are in place and remain effective. Based on this information, I believe the proposal is protective of public health and concur with the remedial plan. Please contact Ms. Maureen Schuck, at (518) 402-7860 if you have any questions.

Sincerely,

FOR

Kevin M. Malone, Deputy Director
Division of Environmental Health Assessment
Center for Environmental Health

**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V**

**RESPONSIVENESS SUMMARY**

**RESPONSIVENESS SUMMARY**
**FOR THE**
**RECORD OF DECISION**
**OPERABLE UNIT 1 OF THE WASTEBED B/HARBOR BROOK**
**SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE**
**TOWN OF GEDDES, ONONDAGA COUNTY, NEW YORK**

## INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns received during the public comment period related to Operable Unit 1 of the Wastebed B/Harbor Brook subsite (Subsite) of the Onondaga Lake Superfund site Proposed Plan and provides the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency's (EPA's) responses to those comments and concerns. All comments summarized in this document have been considered in NYSDEC and EPA's final decision in the selection of a remedy to address the contamination at the Subsite.

## SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

Honeywell International, Inc., (Honeywell), under NYSDEC's oversight, conducted field investigations at the Subsite from 2000 through 2007, which culminated in the completion of a remedial investigation (RI)[1] report in March 2015 and a feasibility study (FS)[2] report in July 2018. NYSDEC and EPA's preferred remedy and the basis for that preference were identified in a Proposed Plan.[3] The RI/FS reports and Proposed Plan were released to the public for comment on July 25, 2018. These documents were made available to the public on its website, http://www.dec.ny.gov/chemical/37558.html, and at information repositories maintained at the Solvay Library, 615 Woods Road, Solvay, New York; Onondaga County Public Library, 447 South Salina Street, Syracuse, New York; Atlantic States Legal Foundation, 658 West Onondaga Street, Syracuse, New York; NYSDEC, Division of Environmental Remediation, 625 Broadway, Albany, New York and NYSDEC Region 7, 615 Erie Boulevard West, Syracuse, New York. An NYSDEC listserv bulletin notifying the public of the availability for the above-referenced documents, the comment period commencement and completion dates and the date of the planned public meeting was issued on July 25, 2018. A notice providing the same information was published in *The Syracuse Post-Standard* on July 26, 2018. An NYSDEC listserv bulletin notifying the public of an extension to the public comment period start was issued on August 23, 2018. A notice of the extension was published in *The Syracuse Post-Standard* on August 23, 2018. The public comment period ended on September 24, 2018.

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[1] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks.
[2] An FS identifies and evaluates remedial alternatives to address the contamination.
[3] A Proposed Plan describes the remedial alternatives considered for a site and identifies the preferred remedy with the rationale for this preference.

On August 16, 2018, NYSDEC conducted a public meeting at the Geddes Town Hall Court Room to inform local officials and interested citizens about the Superfund process, present the Proposed Plan for the Subsite, including the preferred remedy, and respond to questions and comments from the public. Approximately 25 people, including residents, the media, and local government officials, attended the public meeting.

**SUMMARY OF COMMENTS AND RESPONSES**

Comments were received at the public meeting and in writing. Written comments were received from:

- Dennis Connors, via an August 7, 2018 email.
- Neely Kelley, New York State Senior Organizer, Mothers Out Front, via an August 9, 2018 email.
- Jenny Strandberg, via an August 9, 2018 email.
- Laura Stam, via an August 9, 2018 email.
- Yayoi Koizumi, via an August 11, 2018 email.
- Lindsay Speer, Director, Creating Change, via an August 8, 2018 email (included with Yayoi Koizumi's August 11, 2018 email).
- Elizabeth Keokosky, via an August 15, 2018 email.
- Abel R. Gomez, via an August 17, 2018 email.
- Annabel Roberts-McMichael, via an August 18, 2018 email.
- Karen Waelder, via an August 21, 2018 email.
- Leslie Noble, via an August 22, 2018 email.
- John Grim, via a September 13, 2018 email.
- Margaret Julie Finch, via a September 13, 2018 email.
- Laura H. Hewitt, via a September 13, 2018 email.
- Jay Leeming, via a September 14, 2018 email.
- Alice McMechen, via a September 14, 2018 email
- Marie Laing, via a September 14, 2018 email
- Thomas, LaClair, via a September 15, 2018 email
- Veronika Soul, via a September 16, 2018 email.
- Emily Reed, via a September 16, 2018 email.
- Les Monostory, Vice President, Central New York Chapter, Isaac Walton league, via letter dated September 12, 2018.
- Hugh Kimball, via email dated September 17, 2018
- Anthony K, via a September 18, 2018 email.
- LPalmer, via a September 18, 2018 email.
- Amy Kallender, via a September 18, 2018 email.
- Mikayla Cleary-Hammarstedt, via a September 19, 2018 email
- Carol Buchovecky, via a September 20, 2018 email
- Celeste Buchovecky, via a September 23, 2018 email
- Hilary-Anne Coppola, via a September 24, 2018 email
- Debby Webster, via a September 24, 2018 email

- Alma Lowry, Of Counsel, Law Office of Joseph J. Heath (submitted on behalf of the Onondaga Nation), via a September 24, 2018 letter

An extension of the public comment period was requested in several emails and during the public meeting.

The transcript from the public meeting can be found in Appendix V-d.

The written comments submitted during the public comment period can be found in Appendix V-e.

A summary of the comments provided at the public meeting and in writing, as well as NYSDEC and EPA's responses to them, are provided below.

**Basis for Preferred Remedy**

Comment #1: A commenter asked why Alternative 4, enhanced cover system with wetland construction/restoration, in-situ treatment and shallow/intermediate groundwater restoration via monitored natural attenuation (MNA) at the Point-of Compliance (POC), is not the preferred alternative.

Response #1: Alternative 4 is similar to the selected alternative, Alternative 3, enhanced cover system with wetland construction/restoration and shallow/intermediate groundwater restoration via MNA at the POC. The difference between the two alternatives is the use of in-situ geochemical stabilization (ISGS) instead of the installation of a low permeability cap on the northeastern shoreline of Wastebed B beyond the wetland footprint within an area of dense non-aqueous phase liquid (DNAPL)-impacted soil/fill material. While Alternative 4 would provide equal protectiveness to Alternative 3, the implementability of soil mixing included in Alternative 4 is uncertain and would need to be further evaluated during the remedial design. In addition, Alternative 3 would significantly reduce the frequency of increased water conditions in the East and West Barrier Wall Collection Systems associated with lake flooding and significant precipitation events compared to Alternative 4. Alternative 3 would also be less costly to implement than Alternative 4.

**Operation, Maintenance, and Monitoring Related to Selected Remedy**

Comment #2: A commenter asked for the time frame for operation, maintenance, and monitoring (O&M) related to the selected remedy. Another commenter stated that the long-term monitoring needs to be made clearer in terms of numbers of years and/or of the conditions that would have to be found before such monitoring would be allowed to be reduced or to end.

Response #2: The cover system under the selected remedy would require maintenance and monitoring in perpetuity. In addition, the Interim Remedial Measures (IRMs) that have been implemented at the Subsite would require O&M in perpetuity. Consistent with EPA guidance, present-worth operation and maintenance costs were calculated based on a 30-year period. Any modifications to required operations, maintenance and monitoring would need to be approved by NYSDEC.

Comment #3: A commenter asked what party will be responsible for O&M. Another commenter opined that the plan and the ROD should make clear what the plans are to hold Honeywell fiscally responsible to meet their many obligations well into the future.

Response #3: After a remedy is formally selected in a Record of Decision (ROD), the NYSDEC intends to negotiate an order on consent with the potentially responsible party (PRP), Honeywell International, Inc. (Honeywell) that would require the development of the design and implementation of the remedy, and long-term O&M and Site Management. Should NYSDEC enter into an agreement with Honeywell for it to implement the remedy, Honeywell will be required to provide financial assurance, such as through a surety performance bond (or other mechanism), to demonstrate that it can complete the work described in the ROD.

Comment #4: A commenter asked what plans or steps have been proposed to prevent erosion of the clean soil materials that are intended to be placed over contaminated soils within the Superfund Site. Another commenter stated that the plan needs to explain the long-term monitoring and maintenance that will be required to keep the soil cover over the waste and to make clear that the groundwater collection and treatment systems will have to remain active for a very long (indefinite) period.

Response #4: The anticipated long-term monitoring and maintenance for the remedy includes maintenance of the cover such as topsoil repair, reseeding if necessary, and inspections. The details of the monitoring and maintenance will be provided in a Site Management Plan (SMP) that will be approved by NYSDEC. It is envisioned that the groundwater collection and treatment systems will need to operate in perpetuity.

**Site Characterization**

Comment #5: A commenter opined that the draft plan perhaps does not emphasize enough the presence and dangers of the contaminants which are much more harmful than Solvay Waste.

Response #5: A summary of both human health and ecological risks attributable to contamination at the Subsite was included in the Proposed Plan and has been included in the ROD. Additional information on the nature and extent of contamination at the Subsite, including tables on contamination in surface soil, subsurface soil, and groundwater have been included in the ROD.

**Feasibility Study**

Comment #6: A commenter opined that there is a potential conflict in that Honeywell's contractor prepared the Feasibility Study (FS) report that provides the basis for selecting one of the least-costly alternatives.

Response #6: While Honeywell's contractor prepared the FS report, NYSDEC and EPA reviewed and provided input on the document. NYSDEC and EPA, not Honeywell, selected the remedy for the Subsite (Alternative 3). While cost is important, the selection of the remedy was based upon consideration of nine evaluation criteria in accordance with federal Superfund legislation, regulations, and guidance. These criteria include overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements that pertain to the subsite, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, state acceptance, and community acceptance. Based upon this evaluation, it was concluded that, while Alternatives 2 through 6 would be protective of human health and the environment, and would address the remedial action objectives, the implementability of soil mixing using chemicals for stabilization, included in Alternative 4, would need to be further evaluated for the Subsite. Also, Alternatives 5 and 6 are significantly more difficult to implement, present significant short-term impacts, and are the least cost-effective means of achieving the objectives. Alternative 3 is more protective than Alternative 2, equally protective and less costly than Alternative 4, and more practicable and implementable than Alternatives 5 and 6. As Alternative 3 includes the installation of a low permeability cap system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material, it would significantly reduce the frequency of increased water conditions in the East and West Barrier Wall Collection Systems associated with lake flooding and significant precipitation events, and, therefore, provide greater long-term effectiveness than would Alternatives 2 and 4.

**Sheet Pile Barrier Wall and Groundwater Collection Systems**

Comment #7: A commenter stated that since there continues to be a flow of contaminants toward the Lake, there should be an explanation as to how flow is being kept from the Lake and from soil near the Lake. The commenter also requested an explanation as to how a barrier or liner would function as part of this system and keep stormwater and groundwater separated.

Response #7: Subsurface sheet pile barrier walls (West and East Walls) and groundwater collection systems from the eastern end of the Willis Avenue/Semet Tar Beds IRM Barrier Wall, crossing Harbor Brook, and extending northeast along the lakeshore were constructed on the site and have been in operation for several years. These systems, in addition to the liner and collections systems installed under the Upper Harbor Brook IRM, eliminate, to the extent practicable, the discharge of contaminated groundwater and DNAPL, into Onondaga Lake. Conditions such as lake flooding associated with spring thaw events have occasionally inundated the East and West Barrier Wall collection systems with additional water in the area where the trenches meet. Also, periods of significant precipitation have at times contributed additional water to the systems, causing water to pool behind the barrier walls in this area. The increased water in the collection systems adversely impacts their operation and effectiveness. The selected remedy includes the installation of a low permeability cap system in this area. This cap system will improve conditions in this area by reducing the infiltration, the frequency of increased water conditions in the systems, and the discharge of groundwater to surface water during seasonally high groundwater levels concurrent with high lake levels. In addition, the cover systems, proper grading and stormwater controls (*e.g.,* lined swales) will limit groundwater infiltration and help direct stormwater off-site.

Comment #8: Concerned about the salty nature of Onondaga Lake, a commenter questioned the long-term integrity of the barrier wall and its ability to continue to prevent the discharge of contaminated groundwater and DNAPL to surface water.

Response #8: The steel sheet pile barrier wall should be effective indefinitely. In addition to the application of an epoxy coating on the steel sheet pile prior to installation to prevent corrosion, five-foot long sacrificial zinc anodes help counterbalance corrosion (the anodes degrade instead of the steel). The anodes, which are located every 15 feet along the wall, are accessible and are periodically checked. They are anticipated to last approximately one hundred years and can be replaced if needed. In addition, for corrosion to occur, steel needs an oxygen-rich environment. Because of the low oxygen environment below the water table, the steel will not rust as quickly as it would at the surface. Long-term O&M also includes monitoring of groundwater levels to ensure an inward gradient (*e.g.,* lower than lake level) is maintained and that the barrier wall is effective.

Comment #9: A commenter asked whether the water that is being intercepted at the barrier wall is contaminated.

Response #9: The water intercepted by the barrier wall is contaminated (groundwater contaminants are summarized in Table 3 of the ROD). The subsurface sheet pile barrier walls and groundwater collection systems were installed to eliminate the discharge of contaminated groundwater into Harbor Brook and Onondaga Lake. The collected groundwater is treated at the Willis Avenue groundwater treatment plant. Any overland flow (*e.g.,* precipitation) would be above the cover, so it would not be contaminated.

Comment #10: A commenter inquired as to the disposition of the treated water.

Response #10: Water that is treated at the Willis Avenue treatment plant must meet state requirements before being discharged to Onondaga Lake. At the treatment plant, the collected groundwater undergoes removal of contaminants including metals, solids, volatile organic compounds, and semi-volatile organic compounds. Effluent from the treatment facility is then conveyed to the Syracuse Metropolitan Wastewater Treatment

Plant (Metro) where it undergoes further treatment to remove ammonia. During wet weather events, the discharge of treated effluent to Metro may be temporarily suspended and the treated water directed to Onondaga Lake.

**Soil Covers, Fencing, Institutional Controls**

Comment #11: A commenter noted that at the amphitheater located on Wastebeds 1-8, people can jump over the fences and go off into the woods. Therefore, the commenter believed that covers, fencing, and institutional controls will not provide adequate protection to those inclined to go off the trail and climb over the fencing at the Subsite.

Response #11: The cover system at the Wastebed B/Harbor Brook Subsite, consisting of between 1 and 2 feet of soil/granular cover (or maintained paved surfaces and buildings), will mitigate potentially unacceptable contaminant exposures to the public.

At the Wastebeds 1-8 subsite and the amphitheater, the controls (e.g., fencing, signs) in place to discourage people from leaving the trails and amphitheater grounds are effective for the intended use of the property and for the public who visit and spend time within the amphitheater boundaries. People who trespass beyond the fences or other barriers are putting themselves at risk of possible injury by falling down steep inclines and/or coming into contact with ticks or other disease carrying insects present in grassy areas. At amphitheater events security is provided in order to deter or prevent visitors from leaving public areas. The need for additional controls to address these safety and biological risks will be evaluated if trespassing in restricted areas becomes excessive or security measures are not adequately enforced.

Comment #12: A commenter asked who will pay for the additional soil cover costs should the use of a portion(s) of the property change in the future (*e.g.,* that would require additional cover material).

Response #12: Any increased costs associated with additional soil cover would be borne by Honeywell/and or the developer/property owner. Any changes would need to be compatible with the SMP, which will identify the use restrictions and engineering controls for the Subsite and document the steps and media-specific requirements necessary to ensure that the institutional and engineering controls remain in place and effective. Change in site use also requires formal notification to NYSDEC, who, in consultation with NYSDOH, will ensure that the remedy remains protective of human health and the environment.

Comment #13: A commenter suggested that the remedy provide for recreational use without a soil cover.

Response #13: The alternative to a soil cover would be excavation and backfilling with clean fill. Excavation would not only be significantly more difficult to implement than utilizing a soil cover, but it would present significant short-term impacts to the community and would be much costlier than a soil cover for the same level of protection. Please also see Response #16.

Comment #14: A commenter inquired as to whether oscillations between extremely wet and extremely dry years due to climate change will alter surface water runoff patterns.

Response #14: Oscillations between extremely wet and dry weather patterns should not pose a problem to an established cover with sufficient growth and proper maintenance. Long-term O&M will address future erosion issues, if necessary. Please also see Response #4.

Comment #15: A commenter stated that the risk to invertebrates, insects, and birds needs to be explained in detail in relation to the areas that are or will be fenced (and for how long) and those that will not require fencing. Maps should be included in the plan or the ROD.

Response #15: The remedy does not rely on fencing to be protective of wildlife. The cover thicknesses incorporated into the selected remedy are consistent with NYSDEC regulation and guidance, and take into account areas where exposed surface soil exceeds NYCRR Part 375 soil cleanup objectives (SCOs) and the current intended and reasonably anticipated future land use, including areas of ecological value. Figures are included in the Proposed Plan and in the ROD and are based on the anticipated uses of the site.

Comment #16: A commenter opined that the varying cover thicknesses proposed for the Lakeshore Area are not sufficiently justified and that portions of the Lakeshore Area were covered with two feet of soil as part of an IRM. The Preferred Alternative, however, only mandates a 1-foot soil cover although there appears to be no significant differences in the contamination between the previously remediated areas and the areas addressed by the selected remedy. DEC should directly address and justify the difference in proposed cover thickness based either on differences in contamination levels or differences in the allowed uses of these areas.

Response #16: Two feet of cover was installed over the materials managed on Wastebed B under the *Wastebed B/Harbor Brook Materials Management, Grading, and Disposal Plan*. These materials contained contamination that, while consistent with other contaminant levels throughout the site, were placed over areas where Solvay waste was present at the surface and surficial contaminant levels may not have been as elevated as materials that were placed there from the IRMs. In addition, this area may be considered a potential ecological use area which would require a two-foot cover.

**Removal of Waste**

Comment #17: A commenter opined that it is inappropriate to operate a hazardous material dump under the selected remedy and that only Alternatives 5 and 6 are actual cleanup options. The commenter also opined that the "investment" in removing the contaminated materials should be made now and removing the contaminated materials will be more beneficial for the health of the lake, city, and county. Other commenters indicated that the designation of the site as a "Waste Management Area" would be an admission that the shorelines have been made into industrial waste landfills and that the Subsite would not ever be cleaned up. Several other commenters indicated that removal of contaminated soil would be preferable to placing a cover over it. One commenter opined that aspects of the proposal directly contradict the code of ethics detailed by the American Academy of Environmental Engineers and Scientists.

Response #17: Placing a soil cover over contaminated materials is a recognized method of preventing human and ecological exposure to contaminated materials. Under Alternative 6, full excavation with off-site disposal and shallow/intermediate groundwater restoration via MNA, would be much more difficult to implement, present significant short-term impacts to the community, and would be considerably costlier than constructing a soil cover. Also, it should be noted that contamination at the Penn-Can Property includes surficial tar and DNAPL located below ground. The selected remedy includes the addition of features (*e.g.*, stabilization, removal), if necessary, in the areas where surficial tar material is present, such that this material is effectively addressed. In addition, the DNAPL will be extracted via recovery wells if it is recoverable. Any removed materials would then be shipped to permitted off-site facilities for treatment and/or disposal. The designation of the Wastebed B/Harbor Brook Subsite and the adjacent In-Lake Waste Deposit Area as a "Waste Management Area" was made to identify the appropriate point of compliance for attainment of groundwater standards. The Subsite will be remediated in a manner that is protective of human health and the environment. The studies conducted, and evaluations and decisions made in regard to selecting the remedy, were in accordance with State and federal laws, policies and guidance.

Comment #18: A commenter noted that complete removal would cost $1.3 billion, which is much less than Honeywell's annual net profit. The commenter noted that according to Honeywell's Securities and Exchange Commission filing, in 2014, it had a net income of $4.3 billion. Another commenter stated that the site needs to be properly cleaned up and that the companies that caused the pollution must show some social responsibility by paying for a total clean-up.

Response #18: While cost is important, whether or not a PRP can afford to implement a specific alternative is not a factor in selecting a remedy for a site. As was noted in Response #6, the selection of a remedy is based upon consideration of nine evaluation criteria, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements that pertain to the subsite, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, state acceptance, and community acceptance.

Comment #19: A commenter expressed concern that people working or walking through the site would face cancer risks as noted in a newspaper article, which stated "...people working or walking through the site would face cancer risks higher than allowed by federal law."

Response #19: The article discussed the results of the baseline human health risk assessment for the Subsite conducted in 2009, which indicate that the contaminated soil present current and/or potential future unacceptable exposure risk based on conditions present at the time the environmental data was collected (*i.e.,* before any remediation). While some of the risks associated with contaminated soil have been mitigated in part by the implemented IRMs, the calculated risks may still be valid as the IRM components relating to placement of clean cover materials did not address all site areas and are not necessarily final actions. The implementation of the selected remedy will effectively eliminate the exposure pathway relating to contaminated surface soil allowing for safe usage of the property for the anticipated future uses.

Comment #20: A commenter stated that the cleanup should be done sustainably to protect the future of the Lake for future generations.

Response #20: The selected remedy utilizes permanent solutions to the maximum extent practicable. In addition, the use of green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy-DER-31,[4] EPA Region 2's Clean and Green Policy[5], and similar guidance would be considered during the design and construction phases, as appropriate.

Comment #21: A commenter suggested that the long-term benefits of full removal of the waste material would be greater due to potential ecological uses of the Subsite being restored as forested areas and wetlands and eliminating the need for long-term monitoring and maintenance.

Response #21: The Outboard Area and Upper Harbor Brook IRMs have increased the ecological value of the Subsite by constructing and restoring acres of wetlands along the lakeshore and Harbor Brook, adding vegetative cover areas, and stabilizing the shoreline. An additional wetland area will be constructed under the selected remedy (see Response #23) and depending on future site use, forested areas may be present (see Response

[4] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

[5] See http://epa.gov/region2/superfund/green_remediation

#33). In addition, even if all the Solvay waste was removed, groundwater collection and treatment may still be necessary because there is contaminated groundwater present in the intermediate groundwater zone below the Solvay waste. It should also be noted that NYSDEC's consideration of current and reasonably anticipated future land use is provided under State regulations at 6 NYCRR Part 375-1.8(f)(9). The current and reasonably anticipated future land uses for the Subsite are commercial and recreational. While full removal of the waste material may result in greater potential ecological use of the Subsite, achieving this result would not necessarily be of greater value than the commercial and recreational benefits that would be obtained in the near term under the selected remedy. It would also not be commensurate with the negative environmental and quality of life impacts that the community would have to endure during the construction timeframe that would be necessary to implement a full removal alternative.

Comment #22: A commenter stated that the evaluation compares the cost of waste removal with the upfront costs of the alternatives which include cover placement, and that the long-term O&M required for the non-removal alternatives is either ignored or greatly discounted.

Response #22: Costs provided in the FS Report and Proposed Plan include estimated capital, annual O&M costs, and total present-worth costs. The anticipated long-term O&M costs for the soil cover placement alternatives includes expenditures for cap maintenance, planting and maintenance of wetlands, continued O&M of the groundwater collection and treatment systems, and inspections. The total present-worth cost of the selected remedy, which includes both upfront capital costs and O&M over a 30-year period, is approximately 1.6% that of the capital cost for Alternative 5, the least costly of the two alternatives which include excavation and off-site disposal of waste material.

**Anticipated Site Uses**

Comment #23: A commenter expressed disappointment that the property will just be used for parking and a trail. Another commenter stated that the property has the potential to serve as valuable natural habitat and be remediated as wetland habitat. Another commenter encouraged extension of the West Shore Trail across the property to improves access to green space and picnic areas.

Response #23: A reasonably-anticipated use of the Lakeshore Property (north of I-690) includes access roads and trails for passive recreational use as part of the Onondaga County West Shore Trail Extension and future public access/use (*e.g.,* fishing). It is anticipated that the portions of the property south of I-690 (Penn-Can Property, Railroad Area) will continue to be used for industrial or commercial purposes and/or may be used as parking for the State Fairgrounds. While the selected remedy will not preclude other appropriate uses of the property, the local governments and the site owners (with NYSDEC input), would determine the future uses of properties. The Subsite is currently multi-zoned by the Town of Geddes and City of Syracuse. The Wastebed B/Harbor Brook Subsite areas, including the Penn-Can Property, Railroad Area and AOS #2, are currently zoned for industrial use. The Lakeshore Area and AOS #1 (45-acres) is zoned as parkland. In addition, there are several ecological areas (*e.g.,* wetlands) that were constructed during the IRMs that will remain under the selected remedy, as well as the wetland that will be constructed as part of the remedy. Please also see Response #21.

Comment #24: A commenter opined that the term “passive recreational use” is not sufficiently explained or defined and that the distinction between passive and active recreational uses should be provided.

Response #24: Based on NYSDEC’s DER-10 Technical Guidance for Site Investigation and Remediation,[6] active recreational uses include activities with a reasonable potential for soil contact, such as: designated picnic areas; playgrounds; or natural grass sports playing fields including surrounding unpaved spectator areas; and passive recreational uses include recreational uses with limited potential for soil contact, such as: artificial surface fields; outdoor tennis or basketball courts; other paved recreational facilities used for roller hockey, roller skating, shuffle board, etc.; outdoor pools; indoor sports or recreational facilities; golf courses; and paved (raised) bike or walking paths.

Comment #25: A commenter was concerned that the Preferred Alternative would cut off potential best uses of the Penn-Can and Railroad Areas and that only Unrestricted Use and Industrial Use were considered and the selected remedy was based on exceedances of Industrial Use Standards. The commenter opined that since these properties are immediately adjacent to parkland, both sites are more likely to be redeveloped for commercial or recreational uses and that unless NYSDEC can justify its assumption that neither site could reasonably be anticipated to be used for commercial or recreational purposes, it should select a remedy that would be compatible with the full range of possible or likely uses.

Response #25: The Penn-Can and Railroad areas are not immediately adjacent to parkland as they are physically separated by highways/roads (I-690 and State Fair Boulevard) and a main CSX railroad track. The selected remedy does not preclude commercial uses on these properties and the covers will be selected depending on the potential site uses. Also see Response #23.

**Wetlands**

Comment #26: A commenter inquired as to the restoration of the wetlands.

[6] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

Response #26: Under IRMs, portions of the Lakeshore and Railroad Areas were restored as wetlands. Four of the five wetland areas in the Railroad Area were also enlarged to compensate for the loss of approximately 0.45 acres of low quality wetland areas on the Penn-Can area. The selected remedy includes additional wetland construction/restoration in the Lakeshore Area.

Comment #27: A commenter inquired as to whether the wetlands would be designed to support local species.

Response #27: The wetlands would be constructed to support plants and wildlife native to the area similar to other wetlands that have been constructed by Honeywell.

**Support for Trail**

Comment #28: A commenter expressed support for the bike trail expansion.

Response #28: Under the Comprehensive Environmental Response, Compensation and Liability Act and comparable federal and state laws, various governmental authorities are designated as trustees for natural resources and are authorized to sue responsible parties to collect damages for injury to such resources arising from the release of hazardous substances. In accordance with a settlement on natural resources damages, Honeywell will construct the portion of the proposed bike trail from east of the current Honeywell Onondaga Lake visitor center to Harbor Brook.

**Onondaga Nation Concerns**

Comment #29: Two commenters asked to what extent the selected remedy reflects concerns expressed by the Onondaga Nation. One commenter provided a copy of the Nation’s May 9, 2018 comments on the draft Proposed Plan. Other commenters expressed support for the concerns raised by the Onondaga Nation.

Response #29: The Onondaga Nation had the opportunity to review the draft Proposed Plan and, among other concerns, objected to the designation of the Subsite and the adjacent In-Lake Waste Deposit Area as a waste management area. The Onondaga Nation’s comments and responses to those comments are included as an attachment to this Responsiveness Summary (see Appendix V-f). Additional comments that were received from the Onondaga Nation during the public comment period were considered and are addressed in this Responsiveness Summary.

Comment #30: A commenter inquired as to whether the Onondaga Nation's “Vision for the Future of Onondaga Lake” was considered in proposing a remedy for this subsite. Other commenters noted that the Lake is considered sacred by the Onondaga Nation.

Response #30: NYSDEC and EPA did consider the Onondaga Nation's "Vision for the Future of Onondaga Lake" among the factors considered in its selection of the remedy for the Subsite. NYSDEC and EPA recognize and respect the Onondaga Nation's cultural and historic ties to Onondaga Lake and the sacred nature of the Lake to the Nation's people and its traditions.

**Alternative Remedy**

Comment #31: A commenter inquired whether there is anything that the public can do to pursue a different remedy.

Response #31: NYSDEC and EPA rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. A change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the remedy was made after NYSDEC and EPA took into consideration all public comments.

Comment #32: A commenter opined that NYSDEC and EPA have never changed a remedy in response to public comments.

Response #32: Public comment is an important aspect of the Superfund program. NYSDEC and EPA have changed elements of remedies in response to public comment. For example, in response to a public comment that the Sediment Containment Area (SCA) that was to be constructed as part of the Onondaga Lake Bottom remedy be considered for the disposal of contaminated sediments and soils removed as part of the remedy for the operable unit 1 portion of the Geddes Brook/Ninemile Creek site, the remedy was modified to include the SCA as a potential alternative disposal location for contaminated soil/sediment excavated from the site. NYSDEC and EPA have and will continue to seriously consider all public comments during the remedy selection phase.

Comment #33: A commenter stated that the future potential uses of this site (picnics, fishing, and other normal park uses) require more than a foot of soil and that the depth of clean soil coverage must be explained and defined depending on projected usage of the area. Other commenters noted that wildlife, which will likely include woodchucks that are capable of tunneling under more than 1-2 feet of soil cover, may expose contaminated soils. The commenters opined that one to two feet of soil cover materials will not be adequate to maintain an environmentally safe separation between surface vegetation and wildlife and the existing heavily contaminated soils that lie underneath. One commenter asked if the remediation plans considered placement of a greater volume of clean soil materials covering surface depths of three to four feet or more. The commenter also asked if there were any research studies or information available to determine what soil remediation measures would effectively reduce the hazards of contaminated soils being moved upwards onto the soil surface layers that will include rooting layers for vegetation and provide habitats for wildlife. Another commenter inquired as to whether a one- or two-foot cover is adequate for trees and roots.

Response #33: The cover thicknesses incorporated into the selected remedy are consistent with NYSDEC regulation and guidance, and take into account areas where exposed surface soil exceeds the SCOs and the current intended and reasonably anticipated future land use. Specifically, where the exposed surface soil at the site exceeds the applicable SCO for protection of human health and/or ecological resources, the soil cover for restricted residential use, is to be a minimum of two feet; for commercial or industrial use, is to be a minimum of one foot; or when an ecological resource has been identified, is to be a minimum of two feet. The cover system will not inhibit tree growth. Cover thickness that would provide for added protectiveness, and/or support of existing mature trees and aesthetics (*e.g.,* application of modified vegetation enhancements, placement of gravel around existing trees), will be considered during the design. Other measures, such as incorporating or supplementing a demarcation layer to serve as an impediment to burrowing, will also be considered, as may be appropriate. The implementation of monitoring and maintenance activities under the SMP and/or O&M Plan will ensure contaminated soils will not be exposed.

**Comment Period**

Comment #34: Several commenters inquired as to whether the comment period could be extended and that an additional meeting be conducted, as many people may be vacationing at the time of the meeting.

Response #34: While NYSDEC and EPA did extend the public comment period, another public meeting is not warranted.

**Remedy Decision**

Comment #35: A commenter asked when a remedy decision would be made. The commenter also asked if the answers to the questions raised during the comment period will be part of the record.

Response #35: The Record of Decision is issued following the end of the public comment period, and the consideration of public comments received.

Comments received at the public meeting and in writing during the comment period have been documented in this Responsiveness Summary Section of the ROD, the document that formalizes the selection of the remedy.

**Tar-Like Contaminants on Penn-Can Property**

Comment #36: A commenter inquired as to how tar-like contaminants on the Penn-Can property migrated through 4 feet of soil and asked whether a similar problem occurred in the Lakeshore Area. Another commenter asked if the tar materials in the Penn-Can property differ in any way from the materials in the Lakeshore Area.

Response #36: Until 1975, operations at the site included a barge loading facility, which transferred asphalt and tar emulsions to vessels on Onondaga Lake via aboveground pipelines. These pipelines were removed, along with the aboveground storage tanks, during the 1978 decommissioning of the Barrett facility. During this decommissioning, approximately 750 cubic yards of asphalt tank bottoms were buried on the property. The tank bottoms were covered with 2 feet of low permeability fill, a geotextile, two feet of fill and a layer of crushed stone.

It is believed that the migration of the tar occurred because of ground vibrations associated with truck traffic in the area during implementation of the Onondaga Lake remedy. During this time, approximately 300 large trucks containing imported clean topsoil and other materials traversed the area on a daily basis. This tar material will be addressed by the selected remedy.

A similar problem did not occur in the Lakeshore Area. Black-stained material was found in the shallow fill material in the Lakeshore Area in wetland area WL2 and at AOS #1. The staining in the shallow fill in these areas is often tar-like in appearance and is composed of PAHs. The stained fill material is incorporated in the fill and occurs above the marl, which suggests that the stained material has a different origin than the coal tar-like DNAPL present on the Penn-Can property. Based on review of historical aerial photography and Subsite borings, it appears that fill may also have been deposited in these low-lying areas sometime between 1959 and 1967. These stained materials were predominantly located within the Outboard Area and were either excavated or capped and covered under the Outboard Area IRM. Some of these materials were also addressed during the installation of the West Wall IRM and East Wall IRM barrier walls and groundwater collection systems.

### Potential Impacts to Historic Resources

Comment # 37: A commenter noted that the Railroad Area would appear to encompass a City of Syracuse protected site documented as the stone remains of the Geddes District Brine Pump House, built in the mid-19th century by the State of New York. The commenter opined that the area should not be compromised by any remedial action and that any proposed construction activity in its environs should be reviewed by the Syracuse Landmark Preservation Board.

Response # 37: The stone remains of the Geddes District Brine Pump House are present in the Railroad Area. This potential resource was noted in a 2009 cultural resources survey report. Some remedial work as part of the Upper Harbor Brook IRM was conducted in the vicinity of the remains, but the area was not disturbed during IRM implementation. Any future remedial work that may be needed in the area will be coordinated with the appropriate authorities and in compliance with the State Historic Preservation Act, and an additional cultural resources investigation of the area will be conducted, if appropriate.

**Community Involvement**

Comment #38: A commenter asked if there was a way to further continue conversation regarding the remediation.

Response #38: If you have additional questions regarding the remedial activities at the Subsite or the Onondaga Lake NPL Site, please contact the NYSDEC Region 7 (Syracuse) Citizen's Participation Specialist at (315) 426-7403 or the contacts listed in the Proposed Plan.

**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-a**

**JULY 2018 PROPOSED PLAN**

# Wastebed B/Harbor Brook

## Subsite of the Onondaga Lake Superfund Site

Geddes, Onondaga County, New York

NYSDEC July 2018 Region 2

***PURPOSE OF THIS DOCUMENT***

This Proposed Plan describes the remedial alternatives considered for soil/fill material and shallow and intermediate groundwater at the Wastebed B/Harbor Brook Subsite (Subsite) and identifies the preferred remedial alternative with the rationale for this preference.

This Proposed Plan was developed by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (EPA) in consultation with the New York State Department of Health (NYSDOH). NYSDEC and EPA are issuing this Proposed Plan as part of their public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Sections 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), as well as the New York State Environmental Conservation Law (ECL) and Title 6 New York Code of Rules and Regulations (NYCRR) Part 375. The nature and extent of the contamination at the Subsite is described in the *Remedial Investigation Wastebeds B/Harbor Brook Site* (RI) and the remedial alternatives summarized in this Proposed Plan are described in the *Wastebed B/Harbor Brook Site Revised Feasibility Study Report* (FS), contained in the Administrative Record file for this Subsite. NYSDEC and EPA encourage the public to review these documents to gain a more comprehensive understanding of the Subsite and the Superfund activities that have been conducted at the Subsite.

This Proposed Plan is being provided as a supplement to the reports listed above to inform the public of NYSDEC and EPA's preferred remedy and to solicit public comments pertaining to all the remedial alternatives evaluated, including the preferred alternative.

NYSDEC and EPA's preferred alternative includes the installation of a minimum one- to two-foot thick cover system that would be protective for current and/or reasonably anticipated future land uses (*e.g.,* active and passive recreational uses) where shallow soil concentrations are above NYCRR Part 375 Soil Cleanup Objectives (SCOs) for ecological, industrial or commercial use; vegetation enhancement; and wetland construction/restoration with a low permeability cover. The alternative also includes the performance of a Preliminary Design Investigation (PDI) and dense non-aqueous phase liquid (DNAPL) evaluation, following which, recovery would be performed on a portion of the Subsite (if recoverable DNAPL is identified). This area would also receive installation of a 1-foot thick soil/granular or asphalt cover and other actions (e.g., removal, stabilization), if necessary, to provide long-term isolation of underlying impacted soils. A Site Management Plan (SMP), implementation of institutional controls, and long-term maintenance and monitoring are also components of the proposed remedy.

The remedy described in this Proposed Plan is the preferred remedy for the Subsite. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the remedy will be made after NYSDEC and EPA have taken into consideration all public comments. NYSDEC and EPA are soliciting public comment on all the alternatives considered in the Proposed Plan and in the detailed analysis section of the *Wastebed B/Harbor Brook Site Revised Feasibility Study* report because NYSDEC and EPA may select a remedy other than the preferred remedy.

**MARK YOUR CALENDAR**

***July 25, 2018 – August 24, 2018***: *Public comment period on the Proposed Plan.*

***Public Meeting***
*Thursday August 16, 2018 at 6:00 PM*
***Open House*** *from 5:00 – 6:00 PM*

*Geddes Town Hall Courtroom*
*1000 Woods Road, Solvay, NY 13209 (enter through atrium doors)*

***Community Role in the Selection Process***

NYSDEC and EPA rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, this Proposed Plan has been made available to the public for a public comment period which begins on July 25, 2018 – and concludes on August 24, 2018.

As noted above, a public meeting and a public availability session will be held during the comment period to elaborate on the reasons for recommending the preferred remedy and to receive public comments. The public meetings will include a formal presentation by NYSDEC of the preferred remedy and other cleanup options for the Subsite.

The open house will be less formal, and provide the public a chance to receive printed information and discuss the cleanup options with NYSDEC and EPA representatives on a one-on-one basis.

Comments received at the public meeting and in writing during the comment period will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document that formalizes the selection of the remedy.

Written comments on this Proposed Plan should be addressed to:

Tracy A. Smith
NYS Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7013
E-mail: tracy.smith@dec.ny.gov

**INFORMATION REPOSITORIES**

The administrative record file, which contains copies of the Proposed Plan and supporting documentation are available at the following locations:

*Onondaga County Public Library*
*Syracuse Branch at the Galleries*
*447 South Salina Street*
*Syracuse, NY 13204*
*315-435-1800*

*Solvay Public Library*
*615 Woods Road*
*Solvay, NY 13209*
*315-468-2441*

*Atlantic States Legal Foundation*
*658 West Onondaga Street*
*Syracuse, NY 13204*
*315-475-1170*

*New York State Department of Environmental Conservation*
*615 Erie Boulevard, West*
*Syracuse, NY 13204*
*315-426-7400*

*New York State Department of Environmental Conservation*
*Attn.: Tracy A. Smith*
*625 Broadway*
*Albany, NY 12233-7013*
*518-402-9676*
*(tracy.smith@dec.ny.gov)*

## SITE BACKGROUND

On June 23, 1989, the Onondaga Lake site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites. On December 16, 1994, Onondaga Lake, its tributaries and the upland hazardous waste sites which have contributed or are contributing contamination to the lake (subsites) were added to EPA's National Priorities List (NPL). This NPL listing means that the lake system is among the nation's highest priorities for remedial evaluation and response under the federal Superfund law for sites where there has been a release of hazardous substances, pollutants, or contaminants.

The Waste Bed B/Harbor Brook Subsite, which is part of the Onondaga Lake NPL site, consists of soil/fill material[1] and shallow and intermediate groundwater. Deep groundwater at this and adjacent subsites (*i.e.,* Wastebeds 1-8, Semet Residue Ponds, and Willis Avenue) is being evaluated by the potentially responsible party, Honeywell International Inc., and will be addressed separately as part of a regional unit. A wetland area, designated SYW-12, is also part of the Subsite and will be addressed in a separate evaluation.

### Site Description and History

**Location:** The 78-acre portion of the Subsite (excluding SYW-12), which is located south of Onondaga Lake in Geddes, New York, includes the Lakeshore Area (including Wastebed B, the former East Flume, Dredge Spoils Areas [DSAs] #1 and #2, and the Interstate 690 [I-690] Drainage Ditch), Penn-Can Property, Railroad Area, Additional Area of Study (AOS) #1, AOS #2, and Harbor Brook. See Figure 1, Site Location.

**Subsite Features:** The Lakeshore Area and Penn-Can Property are fenced. The only building present on the Subsite is a pump station to convey groundwater to the Willis Avenue groundwater treatment plant (GWTP). The former Penn-Can Property buildings were previously demolished (see Figure 2). Surface water drainage structures and storm sewers related to I-690 are also present. A Site Plan can be found on Figure 3.

**Subsite Geology and Hydrogeology:** The local geology consists of soil and fill material (including Solvay waste) overlying

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[1] Portions of the Site were historically used for the deposition of Solvay waste, an inert material consisting largely of calcium carbonate, calcium silicate, and magnesium hydroxide. The term "soil/fill material" throughout this document refers to Solvay waste and the overlying fill materials (*e.g.*, cinders, gravel, crushed limestone, fly ash, silt and clay).

marl/peat, silt, clay, fine-grained sand/basal sand, gravel, till, and bedrock.

The Subsite has three distinct groundwater zones:

- A shallow zone within the soil/fill layer and underlying Solvay waste (where present);
- An intermediate zone within the marl/peat layer; and
- A deep zone that encompasses the silt and fine-grained sand deposits and the basal sand and gravel deposits (when present) located below the silt and clay confining unit.

The elevation of the shallow zone ranges from a minimum elevation of approximately 320 feet mean sea level (msl) along the lake shore to 395 feet msl at the Penn-Can property. The maximum thickness of this unit is approximately 40 feet with an average thickness around 15 feet. The marl unit ranges from 320 feet msl to 365 feet msl. The maximum thickness of the marl is approximately 30 feet near the lake and the average thickness is about 15 feet. The deep sand and gravel ranges from 235 feet msl to 335 feet msl with the deep elevations being closer to Onondaga lake. This zone has a maximum and average thickness of approximately 10 feet and 5 feet, respectively.

Shallow and intermediate groundwater generally flowed toward and discharged into Onondaga Lake and Harbor Brook prior to the installation of the East Barrier Wall, West Barrier Wall, and Upper Harbor Brook Interim Remedial Measures (IRMs).[2]

There is an upward vertical gradient on the Lakeshore Area from the deep groundwater to the intermediate groundwater and Onondaga Lake; however, due to the low hydraulic conductivity of the silt and clay confining layer above the deep groundwater zone, there is little deep groundwater movement vertically through this confining layer to the intermediate groundwater and Onondaga Lake. Deep groundwater contains a naturally-occurring halite brine.

**History of the Subsite**

<u>Lakeshore Area</u>
Historical use of Wastebed B was for the deposition of Solvay waste. In approximately 1898, the filling of Wastebed B was initiated by the construction of wooden bulkheads in the lake and placement of Solvay waste out to the bulkhead line. Wastebed B received Solvay waste until approximately 1926. Coke plant waste from the former AlliedSignal Main Plant (located south of the Willis and Semet Subsites, see Figure 1) may have been disposed of concurrent with the Solvay waste. Additionally, sewage sludge from the Syracuse Metropolitan Wastewater Treatment Plant (Metro) was disposed of on the southeast portion of the bed in the late 1950s and early 1960s. Modification of the Onondaga Lake shoreline has occurred due to erosional and depositional forces, as well as historical discharges from the former East Flume.

The East Flume was originally an excavated drainage ditch that received process cooling waters from the former Main and Willis Avenue Plants. In addition to cooling waters, the East Flume also carried a combined (Solvay, sanitary, mercury, and organic) waste stream from the Main and Willis Avenue Plants to Onondaga Lake. The East Flume historically received storm water from Solvay Paperboard, General Chemical Corporation, Landis Plastics, and the Village of Solvay. It also received process waters from the Trigen Syracuse Energy Corporation. Water depths within the flume typically ranged between 2 feet and 6 feet, and channel width varied approximately from a minimum of 20 feet to a maximum of 150 feet.

<u>Penn-Can Property</u>
In 1919, the Barrett Division of the Semet Solvay Company of Allied Chemical Corporation (a predecessor of Honeywell) began operations. Barrett produced various asphalt emulsions and some coal tar based products used in road construction (*i.e.,* asphalt tar materials). The primary constituents of these materials were asphalt, coal tar, caustic soda and muriatic acid. Until 1975, the operation included a barge loading facility, which transferred emulsions to vessels on Onondaga Lake via above ground pipelines. These pipelines were removed, along with the aboveground storage tanks, during the 1978 decommissioning of the Barrett facility. In 1978, approximately 750 cubic yards (cy) of asphalt tank bottoms were buried on the property in a pit. The tank bottoms were covered with 2 feet of low permeability fill, a geotextile, and 2 feet of fill. The pit was subsequently covered with a layer of crushed stone. The locations of historic tanks and structures and the approximate location of the pit are shown on Figure 2. In 1983, the property was purchased by Penn-Can Road Materials, Inc. Until recently, the property was being used by Spano Container Corporation for the storage of equipment and fill material of unknown quality was placed on the southern portion of the property. (See “Penn-Can Property Fill” on Figure 2). The buildings on this property were demolished in October 2013, and Honeywell purchased the property in November 2013. This area is currently being used to support the adjacent remedial construction efforts, with imported stone and soil materials being stored

[2] The term “IRM” describes an activity that is necessary to address either emergency or non-emergency site conditions, which in the short-term, need to be undertaken to prevent, mitigate or remedy environmental damage or the consequences of environmental damage attributable to a site. An IRM is equivalent to a non-time critical removal under the CERCLA removal program pursuant to 40 CFR Part 300.415(b)(2).

on the property. The Penn-Can Property drainage ditch and wetland areas were remediated as part of the Upper Harbor Brook IRM. Localized areas of surficial tar were observed on the Penn-Can Property during Summer 2017.

Railroad Area
While a review of historical aerial photographs indicate that the property has been vacant and has not been used for production purposes, Solvay waste was observed in subsurface borings in the northern portion of the Railroad Area. Subsequent to the RI investigation, the area ditches, associated wetlands, and the length of Harbor Brook along the Railroad Area were remediated as part of the Upper Harbor Brook IRM.

AOS #1
Based on review of historical aerial photographs, this area (see Figure 3) is a floodplain created by the deposition of Onondaga Lake and Harbor Brook sediments from dredging during the 1950s and 1960s. There is also evidence that non-Solvay waste fill was likely placed during this time. Subsequent to the RI investigations and as part of the East Barrier Wall IRM, the lower portion of Harbor Brook was rerouted through AOS #1 and a vertical sheetpile barrier wall and collection system were installed through AOS #1.

AOS #2
AOS #2 is situated east of Harbor Brook and south of I-690 between Harbor Brook and the western dike of Wastebeds D and E (Figure 3). Aerial photographs indicate that Wastebeds D and E were inactive by 1926. Several buildings were constructed on the eastern end of Wastebed D between 1959 and 1966. Currently, the eastern end of Wastebeds D and E is occupied by multiple car dealerships. The Wastebed D/E Drainage Ditch on AOS #2 was remediated as part of the Upper Harbor Brook IRM.

Harbor Brook
Under the East Wall IRM, Upper Harbor Brook IRM, and Outboard Area IRM (see IRM details below), the lower portion of Harbor Brook (see Figure 3) was remediated and also rerouted through AOS #1.

Mitigation Wetlands
A total of 16.3 acres of delineated jurisdictional wetlands were present on the Subsite. Remediation efforts completed in association with the Onondaga Lake remedy, as well as upland remedies, including the IRMs discussed later in this document, impacted portions of these wetlands. As a result, additional wetlands were constructed at the Wastebeds 1-8 Subsite.

As part of Onondaga Lake maintenance and monitoring, a comprehensive plan has been developed to ensure that wetland mitigation requirements along the Onondaga Lake shoreline are met.

**Interim Remedial Measures**

In 2000, Honeywell and NYSDEC entered into an Administrative Consent Order (ACO) to conduct an RI/FS. Various IRMs have been implemented at the Subsite, consistent with the ACO. The IRMs are presented on Figure 4 and consist of the following:

- East Flume IRM (and Abandonment of 42-inch Picric Acid Sewer) – This IRM was performed as part of the adjacent Willis Avenue Subsite remedial activities. The IRM activities included the construction of a 48-inch outfall pipe and redirection of storm water and process water flow that discharged to the East Flume directly to Onondaga Lake (the East Flume was subsequently removed/backfilled under IRMs discussed below). In addition, a historical sewer that traversed the Willis Avenue Subsite and discharged to Onondaga Lake was rerouted around the Subsite and redirected into this 48-inch outfall. Approximately 1,500 cy of soil excavated[3] during construction of the East Flume IRM was placed on Wastebed B and managed under the *Wastebed B Materials Management, Grading and Disposal Plan*[4].

[3] The material from this and other IRM's discussed below were sampled to determine that it was non-hazardous and could be managed on-Site. These materials were consistent with remaining Site-related material and are evaluated under this Proposed Plan.

[4] Excavated materials from IRMs conducted at the Site were placed on Wastebed B in a designated placement area based on the source of the excavated material and managed under the *Wastebed B Materials Management, Grading and Disposal Plan*. Subsequent to final placement, these materials were graded and covered with 2 feet of clean material (approximately 18 inches of low permeable material and 6 inches of topsoil) and seeded with native plant species. The placed materials and cover extend

- West Barrier Wall IRM – This IRM included the construction of a subsurface sheet pile barrier wall and groundwater collection system from the eastern end of the Willis Avenue/Semet Tar Beds (Willis/Semet) IRM Barrier Wall to the western bank of Lower Harbor Brook. The purpose of the West Wall IRM was to eliminate, to the extent practicable, the discharge of contaminated groundwater and non-aqueous phase liquid (NAPL) (and collect NAPLs, as feasible) into Onondaga Lake. Grading, backfilling, and restoration of portions of Wastebed B followed the installation of the barrier wall and groundwater collection system. This IRM is also part of a larger groundwater collection and treatment system consisting of the Willis/Semet IRM and the Wastebed B/Harbor Brook East Wall IRM to address area groundwater. Approximately 37,250 cy of material removed during West Wall IRM construction was placed and managed on Wastebed B consistent with the *Wastebed B Materials Management, Grading and Disposal Plan*. In addition, portions of the East Flume were backfilled as part of this IRM.

- East Barrier Wall IRM – The East Wall IRM response action was selected in the 2011 East Barrier Wall Interim Remedial Measure, Response Action Document (RAD). The IRM included the construction of a subsurface sheet pile barrier wall and groundwater collection system from the eastern end of the West Wall, crossing Harbor Brook, and extending northeast along the lakeshore for approximately 1,150 feet. The purpose of the East Wall IRM is to eliminate, to the extent practicable, the discharge of contaminated groundwater and NAPL (and collect NAPLs, as feasible) into Harbor Brook and Onondaga Lake. The East Wall IRM included the following:

  - Temporary rerouting of a section of Lower Harbor Brook including excavation of the new channel and backfilling of the former channel.
  - Replacement of a downstream culvert located in Harbor Brook.
  - Installation of the sheet pile barrier wall and groundwater collection system.
  - Placement of approximately 8,700 cy of material on Wastebed B consistent with the *Wastebed B Materials Management, Grading and Disposal Plan*.
  - Restoration of impacted areas.

  The rerouted section of Lower Harbor Brook was temporary. The final restoration of Lower Harbor Brook was included as part of the lake capping and dredging project and performed in accordance with the lake-wide plan for habitat restoration. This IRM is also part of a larger groundwater collection and treatment system consisting of the Willis/Semet IRM and the Wastebed B/Harbor Brook IRM to address area groundwater. In 2015, the East Wall Collection Trench Optimization project to reduce infiltration of water into the collection system during rainfall events and high lake levels was completed. This work included the following:

  - Grading and installation of a minimum 2-foot of clean clay/soil cover over 2.2 acres.
  - Installation of approximately 870 linear feet of clay liner along the barrier wall extending from the barrier wall inland to the access pathway.
  - Extension of the access pathway approximately 900 linear feet.
  - Restoration of approximately 2.0 acres with topsoil, mulch, and seeding to establish grassland cover.
  - Raised electrical utility man ways, piezometers, vaults, and cleanouts to the proposed grade.
  - Installation of additional cleanouts on the groundwater collection system force main.
  - Installation of protection for the existing inclinometers on the barrier wall.

- Upper Harbor Brook IRM – The Upper Harbor Brook IRM included the following (see Figure 4):

  - Installation of three groundwater collection trench sections adjacent to Harbor Brook to prevent the discharge of contaminated groundwater to Harbor Brook.
  - Excavation of sediments, installation of a geomembrane liner or concrete, and restoration of the substrate in open water areas OW-1, 2, 3, and 4 in Harbor Brook.
  - Cleaning of Culvert 5 in Harbor Brook and two culverts in Railroad Ditch-1 and -2. Cleaning and sealing of Culverts-2, 3 (east and west), and 4 in Harbor Brook.
  - Excavation of sediments from the I-690 Drainage Ditch, Penn-Can Property Drainage Ditch, Wastebed D/E Drainage Ditch, Railroad Ditch-1 and 2, and restoration of the ditch substrate.
  - Installation of a geomembrane liner and groundwater collection trench beneath the I-690 Drainage Ditch.
  - Installation of 150 feet of geomembrane liner under the downstream section of the Wastebed D/E Drainage Ditch (starting at OW-3).

over an approximate 12-acre area on Wastebed B (“Staged Material” area on Figure 4).

- o Excavation of sediments from Penn-Can wetland areas WPC1, WPC2, and WPC3; and restoration of substrate. These areas were not restored as wetlands.
- o Excavation of sediment and restoration of substrate in Railroad Area wetlands WRR1, WRR2, WRR3, WRR4, WRR5, and WL6, with WRR1, WRR2, WRR3, and WRR4 expanded to provide compensatory acreage for WPC1, WPC2, and WPC3.
- o Cleaning and video inspection of sections of the I-690 storm sewer conveyance system that discharge to the I-690 Drainage Ditch.
- o Installation of a passive NAPL collection system in OW-1, 3, and 4.
- o Placement of approximately 40,000 cy of excavated material generated during construction of the Upper Harbor Brook IRM on Wastebed B consistent with the *Wastebed B Materials Management, Grading and Disposal Plan*.

The purpose of the Upper Harbor Brook IRM was to eliminate, to the extent practicable, the discharge of impacted groundwater and NAPL (and collect NAPLs, as feasible) into Harbor Brook and Onondaga Lake.

<u>Outboard Area IRM</u> – The Outboard Area IRM response action, which was selected in the 2012 Outboard Area Interim Remedial Measure RAD, included the removal of contaminated soil and sediments and the placement of an isolation cap (including portions of the East Flume), which achieved final grades lower than the existing grade elevations to facilitate habitat restoration. Based on the anticipated cap thicknesses and target final grades for the western and eastern Outboard Areas, most of the excavation was conducted to depths typically ranging from 5 to 10 feet with additional hot spot excavation/dredging to a maximum depth of 15 feet of Outboard Area materials where concentrations of dichlorobenzenes and xylene exceeded the hot-spot criteria developed for the Onondaga Lake remedy. The cap was designed to isolate contamination in remaining sediments and soils.

Habitat restoration in the Outboard Area created emergent wetland areas and habitat that is suitable for northern pike reproduction. The restoration design included deeper pools for nursery habitat that coincide with the hot spot removal areas as a means of creating variable topography. As appropriate, additional fill materials were placed within the Outboard Area to achieve the final post-cap target grades.

A total of 229,500 cy of material was removed under the IRM. Approximately 64,000 cy of dry material was relocated to an area inboard of the barrier wall on Wastebed B consistent with the *Wastebed B Materials Management, Grading and Disposal Plan*. The remaining 165,500 cy was managed with the dredged Onondaga Lake sediments at the Sediment Consolidation Area at Wastebed 13.

Capping of soil/sediment/fill materials left in-place to isolate the remaining contamination, as part of the Onondaga Lake remedy, was completed in Fall 2016. Maintenance and monitoring of the Outboard Area IRM is included as part of Onondaga Lake monitoring.

- <u>Material Staging and Support Areas</u> – In addition to the materials managed under the *Wastebed B/Harbor Brook Materials Management, Grading, and Disposal Plan*, clean fill was placed to construct material staging and support areas in an 11.1-acre area on the western portion of Wastebed B and a 6-acre portion of the Penn-Can Property to support the Onondaga Lake dredging and capping efforts (see Figure 3).

In summary, IRMs have been implemented to address contaminated media at the Subsite. Specifically, Subsite DNAPL, shallow and intermediate groundwater discharges to Onondaga Lake and Harbor Brook are being addressed by barrier walls, a liner in Harbor Brook, and groundwater collection systems. These systems have been implemented to mitigate potential shallow and intermediate groundwater and DNAPL discharge to Onondaga Lake and Harbor Brook. Subsequent monitoring and observations have demonstrated that these potential discharges of shallow and intermediate groundwater and DNAPL have been mitigated and address IRM objectives related to discharges of groundwater and NAPL to Onondaga Lake.

<u>Current Zoning and Land Use</u>: The Subsite is currently multi-zoned by the Town of Geddes and City of Syracuse. The Wastebed B/Harbor Brook Subsite areas, including the Penn-Can Property, Railroad Area, AOS #1 and AOS #2, are currently zoned for industrial use in the Town of Geddes and City of Syracuse. The eastern extent of the Lakeshore Area along the Onondaga Lake shoreline (45-acres) is zoned as parkland within the City of Syracuse. Based on the land use evaluation, the reasonably anticipated use of the Lakeshore Property (north of I-690) is for construction of paved roads and trails for passive recreational use as part of the Onondaga County West Shore Trail Extension and future access/use of the Southwest Lakeshore Area (an area along Onondaga Lake currently being enhanced for public use). It is reasonably anticipated that the portions of the property south of I-690 (Penn-Can Property, Railroad Area) will continue to be used for industrial or commercial purposes and/or may be used for parking for the State Fairgrounds.

## *RESULTS OF THE REMEDIAL INVESTIGATION*

To delineate the nature and extent of contamination, the analytical results from the RI sampling were compared to the respective SCOs provided in 6 NYCRR Part 375 *Environmental Remediation Programs* applicable to each land use type, including the Commercial Use SCOs (which includes passive recreational uses, such as walking trails), Industrial Use SCOs, and Unrestricted Use SCOs. The Unrestricted Use SCOs represent the concentration of a constituent in soil which, when achieved at a site, are sufficiently low so that no use restrictions are required on the site for the protection of public health, groundwater and ecological resources. Additional information can be found in the RI report.

### Shallow Soil/Fill Materials (0- to 2-feet below ground surface [bgs])

Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDD/Fs), and inorganics were detected in shallow soil/fill material on the Subsite as described below. The data were compared to the Part 375 SCOs for Industrial, Commercial, and Unrestricted Uses.

<u>Lakeshore Area</u>
VOCs, SVOCs, pesticides, PCBs, and metals were detected in the shallow soil/fill material on the Lakeshore Area. The contaminants of concern (COCs) exceeding Part 375 Commercial Use SCOs predominantly included benzo(a)pyrene (concentration range of 0.06 to 6.4 milligrams per kilogram [mg/kg]), benzo(b)fluoranthene (range of 0.071 to 9.5 mg/kg), benzo(a)anthracene (range of 0.05 to 6.9 mg/kg), 1,4-dichlorobenzene (range of 0.0095 to 350 mg/kg), dibenzo(a,h)anthracene (range of 0.072 to 1.4 mg/kg), PCBs (individual aroclors ranging from 0.02 to 6 mg/kg), barium (range of 32.5 to 1,240 mg/kg), cadmium (range of 0.055 to 121 mg/kg), copper (range of 13.4 to 744 mg/kg), and mercury (range of 0.09 to 64.3 mg/kg), while COCs exceeding the Part 375 Industrial Use SCOs were predominantly due to benzo(a)pyrene, cadmium, and mercury. COCs exceeding the Part 375 Unrestricted Use SCOs included acetone, chlorinated benzenes, polycyclic aromatic hydrocarbons (PAHs), PCBs, and metals.

<u>Penn-Can Property</u>
VOCs, SVOCs, pesticides, PCBs, and metals were detected in the shallow soil/fill material on the Penn-Can Property. The COCs exceeding the Part 375 Industrial and Commercial Use SCOs predominantly included arsenic (range of 2.5 to 34.4 mg/kg), mercury (range of 0.04 to 7.9 mg/kg), and the PAHs benzo(a)pyrene (range of 0.48 to 100 mg/kg), benzo(b)fluoranthene (range of 0.37 to 81 mg/kg) and benzo(a)anthracene (range of 0.44 to 6.9 mg/kg), For Part 375 Unrestricted Use SCOs, COC exceedances predominantly included arsenic, lead, mercury, and PAHs, as well as some PCBs and pesticides exceedances.

<u>Railroad Area</u>
VOCs, SVOCs, pesticides, PCBs, and metals were detected in the shallow soil/fill material on the Railroad Area. The COC exceeding its Part 375 Commercial SCO is barium (range of 18.6 to 879 mg/kg), with no COCs exceeding Part 375 Industrial SCOs. The COCs exceeding the Part 375 Unrestricted Use SCOs included barium, lead, mercury, acetone, and PAHs.

<u>AOS #1</u>
VOCs, SVOCs, pesticides, PCBs, PCDD/Fs, and metals were detected in the shallow soil/fill material on AOS #1. The COCs exceeding the Part 375 Industrial and Commercial Use SCOs were mercury (range of 0.72 to 11.3 mg/kg), PAHs including benzo(a)pyrene (range of 2 to 32 mg/kg), benzo(b)fluoranthene (range of 1.9 to 27 mg/kg), and benzo(a)anthracene (range of 1.2 to 32 mg/kg), and PCBs (individual aroclors ranging from 0.2 to 4 mg/kg). For Part 375 Unrestricted Use SCOs, the COC exceedances included chlorinated benzenes, PAHs, PCBs, and various metals (including mercury).

<u>AOS #2</u>
VOCs, SVOCs, and metals were detected in the shallow soil/fill material on AOS #2. COCs exceeding the Part 375 Industrial and Commercial Use SCOs included the PAHs benzo(a)pyrene (range of 3.2 to 6.6 mg/kg), benzo(b)fluoranthene (range of 2.3 to 5 mg/kg), and benzo(a)anthracene (range of 3.3 to 5.8 mg/kg). Acetone, PAHs, lead, and mercury exceeded the Part 375 Unrestricted Use SCOs.

### Subsurface Soil/Fill Material (at depths greater than 2-feet bgs)

VOCs, SVOCs, pesticides, PCBs, PCDD/Fs, and inorganics were detected in subsurface soil/fill material on the Subsite as described below. The analytical results were compared to the Part 375 SCOs for Commercial, Industrial, and Unrestricted Uses.

Lakeshore Area

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the subsurface soil/fill material on the Lakeshore Area. The COCs exceeding the Part 375 Commercial and Industrial Use SCOs predominantly included benzene (range of 0.00006 to 190 mg/kg), total xylenes (range of 0.0007 to 860 mg/kg), PAHs including benzo(a)pyrene (range of 0.12 to 150 mg/kg), benzo(b)fluoranthene (range of 0.066 to 210 mg/kg), benzo(a)anthracene (range of 0.081 to 350 mg/kg) and naphthalene (range of 0.067 to 21,000 mg/kg); arsenic (range of 0.42 to 55.4 mg/kg), barium (range of 9.9 to 1,700 mg/kg), PCBs (individual aroclors ranging from 0.035 to 6.59 mg/kg), and mercury (range of 0.03 to 97 mg/kg). The COCs exceeding the Part 375 Unrestricted Use SCOs included chlorinated benzenes, benzene, toluene, ethylbenzene and xylene (BTEX), PAHs, phenolic compounds, pesticides, PCBs, and metals.

As described above, soils and sediments excavated during the various IRMs were placed on Wastebed B within the Lakeshore Area and managed under the *Wastebed B/Harbor Brook Materials Management, Grading, and Disposal Plan*. This data is now included as subsurface soil/fill material within the Subsite dataset. VOCs, SVOCs, pesticides, PCBs, PCDD/Fs, and metals were detected in the Wastebed B staged materials. The COCs exceeding the Part 375 Commercial and Industrial SCOs predominantly included PAHs, PCBs, arsenic, and mercury. For Part 375 Unrestricted SCOs, the COC exceedances included chlorinated benzenes, BTEX compounds, PAHs, phenolic compounds, and various metals, with some pesticide and PCB exceedances.

Penn-Can Property

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the subsurface soil/fill material on the Penn-Can Property. The COCs exceeding the Part 375 Industrial and Commercial Use SCOs predominantly included benzene (range of 0.0009 to 180 mg/kg), total xylenes (range of 0.003 to 990 mg/kg), PAHs including benzo(a)pyrene (range of 0.07 to 1,400 mg/kg), benzo(b)fluoranthene (range of 0.043 to 1,900 mg/kg), benzo(a)anthracene (range of 0.073 to 2,000 mg/kg) and naphthalene (range of 0.045 to 14,000 mg/kg), arsenic (range of 0.76 to 103 mg/kg) and mercury (range of 0.006 to 5.9 mg/kg). The COCs exceeding the Part 375 Unrestricted Use SCOs were predominantly BTEX compounds, PAHs, various metals, and included some pesticides and PCBs.

Railroad Area

VOCs, SVOCs, pesticides, PCBs, and metals were detected in the subsurface soil/fill material on the Railroad Area. COCs exceeding the Part 375 Industrial and Commercial Use SCOs included benzo(a)anthracene (range of 0.16 to 8.2 mg/kg), benzo(a)pyrene (range of 0.17 to 3.7 mg/kg), and arsenic (range of 0.8 to 22.7 mg/kg). The COCs exceeding the Part 375 Unrestricted Use SCOs included BTEX compounds, PAHs, three pesticides, and various metals.

AOS #1

VOCs, SVOCs, PCBs, and metals were detected in the subsurface soil/fill material on AOS #1. The COCs exceeding the Part 375 Industrial and Commercial Use SCOs predominantly included mercury (range of 0.02 to 6.2 mg/kg) and PAHs including benzo(a)pyrene (range of 0.13 to 56 mg/kg), benzo(b)fluoranthene (range of 0.091 to 35 mg/kg), benzo(a)anthracene (range of 0.085 to 63 mg/kg) and naphthalene (range of 0.48 to 570 mg/kg). The COCs exceeding the Part 375 Unrestricted Use SCOs were predominantly PAHs and various metals (including mercury), with some exceedances for BTEX compounds, PCBs, and chlorinated benzenes.

AOS #2

VOCs, SVOCs, pesticide (4,4-DDE), and metals were detected in the subsurface soil/fill material on AOS #2. However, only acetone exceeded its Part 375 Unrestricted Use SCO, and there were no exceedances of the Part 375 Commercial or Industrial Use SCOs.

**Shallow and Intermediate Groundwater**

Shallow and intermediate groundwater discharges to Onondaga Lake, Harbor Brook, East Flume, and drainage ditches located on the Subsite have been addressed by the barrier walls and/or groundwater collection systems installed as part of the West Wall IRM, East Wall IRM, and Upper Harbor Brook IRM. Prior to the IRMs, groundwater quality was evaluated for the Subsite during the Preliminary Site Assessment (PSA), RI, Supplemental RI, and IRM-related investigations in the shallow and intermediate groundwater zones. The analytical data were compared to the New York State Class GA groundwater standards and guidance values (SGVs). Deep groundwater at the Subsite will be further evaluated and addressed separately as part of a regional unit with other nearby Honeywell subsites (*i.e.,* Wastebeds 1-8, Willis Avenue, and Semet Residue Ponds).

Lakeshore Area

VOCs, SVOCs, and inorganics were detected in Lakeshore Area shallow and intermediate groundwater. The COCs exceeding the Class GA SGVs for shallow and intermediate groundwater included:

- VOCs: benzene (range of 0.3 to 3,900 micrograms per liter [µg/L] [SGV is 1 µg/L]), toluene (range of 0.17 to 5,740 µg/L [SGV is 5 µg/L]), ethylbenzene (range of 0.7 to 350 µg/L [SGV is 5 µg/L]), total xylenes (range of 0.29 to 3,500 µg/L [SGV is 5 µg/L]), chlorinated benzenes including 1,2-dichlorobenzene (range of 0.19 to 7,560 µg/L [SGV is 3 µg/L]) and 1,4-dichlorobenzene (range of 0.11 to 8,700 µg/L [SGV is 3 µg/L]), acetone (range of 3 to 460 µg/L [SGV is 50 µg/L]), and styrene (range of 0.3 to 850 µg/L [SGV is 5 µg/L])
- SVOCs: PAHs including naphthalene (naphthalene range of 1.5 to 35,000 µg/L [SGV is 10 µg/L]), and phenolic compounds including phenol (phenol range of 1.4 to 18,000 µg/L [SGV is 1 µg/L]) and 2-methylphenol (range of 1.2 to 8,000 µg/L [SGV is 1 µg/L])
- Inorganics: sodium (range of 62 to 42,500 milligrams per liter [mg/L] [SGV is 20 mg/L]), iron (range of 0.03 to 29 mg/L [SGV is 0.3 mg/L]), chloride (range of 130 to 64,000 mg/L [SGV is 250 mg/L]), mercury (range of 0.00005 to 0.03 mg/L [SGV is 0.0007 mg/L]), and magnesium (range of 0.06 to 513 mg/L [SGV is 0.3 mg/L]).

Elevated VOC and SVOC concentrations (especially BTEX compounds, PAHs, and phenolic compounds) in the shallow groundwater were observed in the eastern portion of the Lakeshore Area, downgradient of the Penn-Can Property, and in the western portion along the former East Flume and in DSA #2. These are related to either the previous activities at the Penn-Can Property, Willis Avenue, and/or dredge spoils from the former East Flume and Onondaga Lake (western portion). The elevated concentrations of mercury in shallow groundwater occurred along the former East Flume. The other inorganic compounds (*i.e.*, sodium, iron, magnesium, etc.) are either related to Solvay waste and/or the native halite brine.

For the intermediate groundwater, BTEX compounds, PAHs, and phenolic compounds were highest downgradient of the Penn-Can Property, while chlorinated benzenes were highest near the former East Flume. Inorganic compounds were variable over the entire area. The containment of shallow and intermediate groundwater is being achieved by the East and West Barrier Wall and Upper Harbor Brook groundwater collection systems.

<u>Penn-Can Property</u>
The COCs detected and exceeding the Class GA SGVs for shallow and intermediate groundwater include:

- VOCs: benzene (range of 1.7 to 1,100 µg/L), toluene (range of 1 to 2,400 µg/L), ethylbenzene (range of 2.4 to 540 µg/L), total xylenes (range of 2 to 4,800 µg/L)
- SVOCs: PAHs including naphthalene (range of 9.5 to 13,000 µg/L) and phenolic compounds including phenol (range of 2 to 250 µg/L) and 2-methylphenol (range of 31 to 230 µg/L)
- Inorganics: sodium (range of 16 to 140 mg/L), iron (range of 0.06 to 9.8 mg/L), manganese (range of 0.006 to 0.36 mg/L [SGV is 0.3 mg/L]), chromium (range of 0.004 to 0.07 mg/L [SGV is 0.05 mg/L]), and lead (range of 0.007 to 0.04 mg/L [SGV is 0.025 mg/L]).

Elevated VOC and SVOC concentrations (especially BTEX compounds, PAHs, and phenolic compounds) in the shallow and intermediate groundwater were observed in the eastern half of the Penn-Can Property, with the highest concentrations observed in the intermediate groundwater.

These are related to the previous historic operations associated with the property. The shallow and intermediate groundwater are being addressed by the barrier walls and/or groundwater collection systems installed as part of the West Wall IRM, East Wall IRM, and Upper Harbor Brook IRM.

<u>Railroad Area</u>
The COCs detected and exceeding the Class GA SGVs for shallow and intermediate groundwater included:

- VOCs: benzene (range of 2.15 to 585 µg/L), toluene (range of 0.2 to 590 µg/L), ethylbenzene (range of 160 to 210 µg/L), total xylenes (range of 0.2 to 1,500 µg/L) and styrene (range of 300 to 400 µg/L)
- SVOCs: bis(2-ethylhexyl)phthalate (BEHP, range of 1.2 to 110 µg/L [SGV is 5 µg/L]), naphthalene (range of 1 to 12,000 µg/L) and phenolic compounds including phenol (range of 52 to 74 µg/L) and 2-methylphenol (range of 39 to 59 µg/L)
- Inorganics: sodium (range of 13.2 to 2,280 mg/L), iron (range of 0.03 to 15 mg/L), chloride (range of 8.6 to 3,770 mg/L), and magnesium (range of 1.48 to 167 mg/L).

Few VOC and SVOC COCs exceeded their Class GA SGVs in the shallow groundwater, but the intermediate groundwater in the eastern end had VOC and SVOC concentrations and exceedances that were similar to the intermediate groundwater on the Penn-Can Property. These COCs are likely related to previous activities at the Penn-Can Property. The shallow and intermediate groundwater are being addressed by the groundwater collection systems installed as part of the West Wall IRM, East Wall IRM, and Upper Harbor Brook IRM.

AOS #1
The COCs detected and exceeding the Class GA SGVs for shallow and intermediate groundwater included:

- VOCs: benzene (range of 0.35 to 2.1 µg/L) and toluene (range of 0.2 to 17.6 µg/L)
- SVOCs: phenolic compounds including phenol (range of 1.4 to 230 µg/L) and 2-methylphenol (range of 1.8 to 4.2 µg/L); and naphthalene (range of 1.1 to 38 µg/L)
- Inorganics: sodium (range of 910 to 26,650 mg/L), iron (range of 0.17 to 43 mg/L), chloride (range of 1,800 to 43,600 mg/L), manganese (range of 0.11 to 5.11 mg/L), and barium (range of 0.19 to 2.3 mg/L [SGV is 1 µg/L]).

Elevated COC concentrations and exceedances were observed in the Outboard Area and inboard of the barrier wall, with variable distribution. These concentrations are likely related to impacted sediment deposition from historical former East Flume discharges and Harbor Brook discharges.

The shallow and intermediate groundwater from AOS #1 are being addressed by the groundwater collection systems installed as part of the East Wall IRM and Upper Harbor Brook IRM, and the capping system installed as part of the Outboard Area IRM/Onondaga Lake remediation.

AOS #2
Intermediate groundwater at AOS #2 had similar COCs exceeding the Class GA SGVs as the eastern corner of the Railroad Area. These included benzene (range of 850 to 960 µg/L), toluene (range of 11.6 to 22 µg/L), ethylbenzene (range of 240 to 300 µg/L), total xylenes (detection of 92.7 µg/L), naphthalene (range of 1,100 to 2,200 µg/L), and inorganics such as chloride (range of 3,910 to 4,700 mg/L), iron (range of 1.8 to 12.5 mg/L), manganese (range of 0.31 to 0.55 mg/L), and sodium (range of 2,360 to 3,000 mg/L). The organics are likely related to previous activities at the Penn-Can Property, while the inorganics are likely related to Solvay waste and/or native brine.

The shallow and intermediate groundwater from AOS #2 is being addressed by the Upper Harbor Brook IRM collection system.

**Surface Water**

Recent surface water data demonstrate that surface water impacts have been addressed by the Upper Harbor Brook IRM, as documented in the Upper Harbor Brook IRM annual reports. Prior to the IRM, surface water quality was evaluated for the Subsite during the PSA, RI, Supplemental RI, and IRM-related investigations for the on-Subsite drainage ditches, East Flume, and Harbor Brook. These analytical data were compared to the New York State Class C surface water SGVs, except for the East Flume. Surface waters impacts to Onondaga Lake from Harbor Brook and the East Flume, as well as the on-Subsite drainage ditches, have been addressed by IRMs (discussed in **Section 1.3**). Surface water samples in Harbor Brook and on-Subsite drainage ditches have been collected annually as part of the Performance Verification program.

Lakeshore Area - I-690 Drainage Ditch
Prior to the IRMs, VOCs, SVOCs, a pesticide, and inorganics were detected in the Lakeshore Area I-690 Drainage Ditch surface water. Elevated COC concentrations and Class C SGV exceedances were observed in the I-690 Drainage Ditch surface water including benzene (range of 9.6 to 130 µg/L), toluene (range of 28 to 270 µg/L), ethylbenzene (range of 2.9 to 21 µg/L), total xylenes (range of 77 to 300 µg/L), naphthalene (range of 160 to 1,400 µg/L), and phenol (range of 17 to 700 µg/L).

Penn-Can Property
Prior to the IRMs, VOCs, SVOCs, and inorganics were detected in the Penn-Can Property Drainage Ditch surface water. In the drainage ditch adjacent to the railroad tracks on the Penn-Can Property, COCs that exceeded the Class C SGVs included naphthalene (range of 12 to 350 µg/L), iron (range of 0.08 to 11.4 mg/L), cyanide (range of 0.01 to 0.03 mg/L), and aluminum (range of 0.11 to 1.33 mg/L).

Railroad Area
Prior to the IRMs, VOCs, SVOCs, and inorganics were detected in the Railroad Area Drainage Ditches surface water. In the two drainage ditches on the Railroad Area, there were few SVOC COCs that exceeded the Class C SGVs including one exceedance each for benzo(a)anthracene (1.6 µg/L), benzo(a)pyrene (2 µg/L), and BEHP (5.2 µg/L). Inorganic COCs that exceeded the SGVs included iron (range of 0.16 to 3.7 mg/L) and aluminum (range of 0.11 to 2.13 mg/L).

Harbor Brook
Prior to the IRMs, VOCs, SVOCs, and inorganics were detected in the Harbor Brook surface water. The COC exceedances observed in the Harbor Brook surface water included naphthalene (range of 5.2 to 2,200 µg/L), aluminum (range of 0.02 to 1.69 mg/L) and iron (range of 0.08 to 12.3 mg/L). These were likely due to Harbor Brook sediment, on-Subsite drainage ditches discharging into the brook, groundwater interaction with Harbor Brook, and upstream inputs.

**Sediment**

Sediments in waterbodies that discharge to Onondaga Lake (*i.e.,* Harbor Brook and East Flume), as well as the on-Subsite drainage ditches and wetland areas, have been addressed by IRMs. The IRMs addressed the sediments by removal and placement of cover material and/or an isolation layer.

**DNAPL and Stained Soils**

DNAPL and stained soils were encountered in soil borings and test pits advanced during the investigations and other remedial work performed at the Subsite. In general, there are six areas of DNAPL, DNAPL-stained soils, or other visibly-contaminated materials that were encountered on the Subsite. Potential migration of the DNAPL has been addressed by IRMs. Some of these materials may exhibit characteristics of principal threat waste. These areas are discussed briefly below and in depth in the RI and FS Reports. A detailed explanation of principal threat waste can be found in the box, "What is a Principal Threat?"

Coal tar-like DNAPL associated with the Penn-Can Property
The coal tar-like DNAPL is found primarily on the Penn-Can Property and downgradient at Wastebed B. To a lesser extent, it is found on the Railroad Area, AOS #2, beneath Harbor Brook, and in the western portion of AOS #1. This DNAPL has a naphthalene chemical signature and its physical characteristics and chemistry are provided in the RI Report. The coal tar-like DNAPL likely originated from the former facility operations/infrastructure, such as tanks, process lines, ditches, and waste tile drains.

The approximate extent of DNAPL found in the fill and marl is presented in the RI Report. Cross sections were developed to evaluate the extent of DNAPL, DNAPL-stained material, and the subsurface lithology as depicted in the RI Report. The coal tar-like DNAPL was also observed in the deep unit on the Penn-Can Property where this unit is closer to the surface and not overlain by the silt and clay confining layer. The DNAPL in the deep unit occurs in the coarse sand above the till/bedrock unit in several locations. The interpreted extent of this DNAPL in the deep unit is presented in the RI Report.

**"What is a Principal Threat?"**

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a Site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to ground water, surface water, or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in groundwater may be viewed as source material.

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

The depositional structure of the marl unit and the initial driving DNAPL head on the Penn-Can Property were the most likely factors controlling the DNAPL migration.

Surficial tar associated with the Penn-Can Property
Since the development of the RI Report, localized areas of surficial tar materials were observed on the Penn-Can Property. These tar materials are potentially related to tank bottoms that were disposed on the Subsite and will be investigated further as discussed in the alternatives below.

Stained soils associated with AOS #1 and Wetland Area WL2
Black-stained material was found in the shallow fill material in the Lakeshore Area in wetland area WL2 and AOS #1 (see Figure 3). The approximate extent of the stained soils is presented in the RI Report. The staining in the shallow fill in these areas is often tar-like in appearance and is composed of PAHs. The stained fill material is incorporated in the fill and occurs

above the marl, which suggests that the stained material has a different origin than the coal tar-like DNAPL.

Based on review of historical aerial photography and Subsite borings, it appears that fill may also have been deposited in these low-lying areas sometime between 1959 and 1967. The nature of fill materials that may have been placed in this area is unknown. This black tar-like material causing the staining appears to be adsorbed to and entrained in the fill.

These stained materials were predominantly located within the Outboard Area and were either excavated or capped and covered under the Outboard Area IRM. Some of these materials were also addressed by the installation of the West Wall IRM and East Wall IRM barrier walls and groundwater collection systems. Stained shallow fill material inboard of the barrier wall is evaluated in this Proposed Plan.

<u>Chlorobenzene DNAPL in soil boring HB-SB-01 at 34 to 36 feet bgs</u>
The chlorobenzene DNAPL is related to operations at the former Willis Avenue plant. This DNAPL has been addressed by the Willis/Semet IRM Barrier Wall and the West Wall portion of the Wastebed B/Harbor Brook IRM.

<u>“Black-stained organic material” associated with the DSAs</u>
The black stained organic material was encountered in the shallow fill along the Upper and Lower (former) East Flume in DSA #1 and DSA #2. The origin of this material is believed to be dredge material from the former East Flume and Onondaga Lake that was generated during the installation of the diffuser building intake pipe in 1977. This material is similar in chemical characteristics to the stained material in AOS #1 and the wetland areas near the mouth of Harbor Brook except that chlorobenzenes tend to be more prevalent.

DSA #1 is located under the area formerly used to support the Onondaga Lake dredging and capping project (Onondaga Lake remedy support area). DSA #2 is predominantly in the Outboard Area with most materials excavated or already addressed under the Outboard Area IRM, while the remaining DSA #2 material was removed as part of West Wall IRM or is addressed in this Proposed Plan.

<u>Tar-like material in Test Pit HB-TP-18</u>
Tar-like material observed in test pit HB-TP-18 appeared to be isolated to this location. The source of this material is unknown, but is likely related to historic operations at the Barrett Paving facility, undigested sewage sludge placed on the eastern portion of Wastebed B during the 1950s and early 1960s, or was co-disposed with the Solvay waste during the operation of Wastebed B. Test pit HB-TP-18 is located below the 12-acre area on Wastebed B where staged materials were previously placed (see Figure 3).

**Conclusions**

Based on the RI, the following conclusions have been drawn:

- COCs identified for the Subsite include BTEX, chlorinated benzenes, naphthalene and PAHs, phenolic compounds, PCBs, PCDD/PCDFs, and inorganics.
- DNAPL, tar materials and stained soils are present in several areas of the Subsite. As noted above, these materials may exhibit characteristics of principal threat waste.

**Waste Management Area**

The NCP preamble language sets forth the EPA’s policy that, for groundwater, “remediation levels generally should be attained throughout the contaminant plume, or at and beyond the edge of the waste management area when waste is left in place.” The NCP preamble also indicates that, in certain situations, it may be appropriate to address the contamination as one waste management area (WMA) for purposes of the groundwater point of compliance (POC). The groundwater POCs for meeting ARARs are established at the WMA boundary.

Due to the presence of historical fill materials deposited at the Subsite and the adjacent in-lake-waste-deposit (ILWD) located within Onondaga Lake, the area will be treated as a waste management area (WMA) (see Figure 5) with the groundwater restoration point of compliance being the WMA unit boundary. The material within the WMA includes Solvay waste comingled with hazardous substances that are contaminants of concern for the site. The management of the waste within the WMA includes meeting Resource Conservation and Recovery Act (RCRA) municipal landfill capping requirements. In many areas, existing covers and/or soil/fill material is expected to meet the $1x10^{-5}$ cm/sec permeability rate required under the Subtitle D requirements. Buildings/asphalt parking lots are expected to achieve and exceed the infiltration requirements. In areas where existing covers or soil/fill material do not meet the permeability requirement, cover material will include materials needed to achieve the required infiltration rate requirements. The WMA boundary is conceptual and may be refined during remedial design.

Based on the results of a 2017 field investigation to assess degradation in groundwater, monitored natural attenuation (MNA) may be a viable option to address contaminated shallow/intermediate groundwater at and beyond the POC. The basis for MNA is supported by an evaluation of the shallow and intermediate groundwater using data collected in 2017 to support an investigation of deep groundwater. Based on multiple lines of evidence, degradation of organic constituents is occurring in shallow and intermediate groundwater. Further evaluation of MNA would need to be conducted as part of the preliminary remedial design and/or O&M.

### *SCOPE AND ROLE OF ACTION*

In addition to this Subsite, eleven other subsites, Onondaga Lake Bottom; LCP Bridge Street; Geddes Brook/Ninemile Creek; Semet Residue Ponds; Willis Avenue; Wastebeds 1-8; General Motors (GM)-Inland Fisher Guide (IFG); Salina Landfill; Ley Creek PCB Dredgings; Lower Ley Creek; and Niagara-Mohawk Hiawatha Blvd, are being addressed as part of the Onondaga Lake NPL site.

Dredging and capping activities for the Onondaga Lake Bottom Subsite commenced in 2012. Dredging and capping activities in the lake were completed in 2014 and 2016, respectively. Habitat restoration activities associated with the remedy were completed in 2017. The dredged material is being managed at a sediment consolidation area (SCA) constructed on a former Solvay wastebed, Wastebed 13. Construction activities at the SCA, which included the placement of an engineered cap, were completed in 2017. The site is undergoing long-term maintenance and monitoring.

Remedies have been fully implemented at the LCP Bridge Street, Geddes Brook/Ninemile Creek, Salina Landfill and Ley Creek PCB Dredgings Subsites. These subsites are undergoing long-term maintenance and monitoring. Remedial activities for portions of, or environmental media at, the Semet Residue Ponds, Wastebeds 1-8, GM-IFG and Niagara-Mohawk Subsites have been completed or are in progress. Other portions of, or media at, these subsites are in the remedial design or RI/FS phase. The Lower Ley Creek Subsite is in the remedial design phase. A RI/FS for the Willis Avenue Subsite is near completion.

The scope of the action for the Wastebed B/Harbor Brook Subsite is to address the soil/fill material not addressed under the IRMs discussed above and to implement additional actions, where needed, in areas previously addressed under the IRMs. The scope of the action for the Wastebed B/Harbor Brook Subsite also includes addressing shallow and intermediate groundwater. NYSDEC and EPA expect this remedy to be a final, comprehensive remedy for the soil/fill material, and for shallow and intermediate groundwater.

Deep groundwater will be evaluated and addressed separately as part of a regional unit.

### **Summary of Quantitative Site Risk Assessments**

As part of the RI process, baseline quantitative risk assessments were conducted for the Subsite to estimate the potential risks to human health and the environment (see “What is Human Health Risk and How is it Calculated?” and “What is Ecological Risk and How is it Calculated?” boxes below). Baseline risk assessments, consisting of a human health risk assessment (HHRA), which evaluates potential risks to people, and a baseline ecological risk assessment (BERA), which evaluates potential risks to ecological receptors, analyze the potential for adverse effects caused by hazardous substance releases from a site assuming no further actions to control or mitigate exposure to these hazardous substances are taken.

#### *Human Health Risk Assessment*

The baseline HHRA considered exposure to many different media through current and future exposure scenarios for different potential receptors. The site is zoned commercial/industrial, and exposure scenarios were developed based on this current and likely future land use. Commercial/industrial workers, utility workers, construction workers, older child and adult trespassers, and child and adult recreational visitors were evaluated for current and potential future exposure through ingestion, dermal contact and inhalation of indoor air, surface and subsurface soil, surface and subsurface sediment, fish tissue, surface water, and outdoor air. In addition, because groundwater is classified by the State of New York as a potable water supply, exposure to groundwater as a drinking water source for adult and child residents was also evaluated as a potential future scenario.

As previously presented in the “Results of the Remedial Investigation” section, the site has several distinct areas that were sampled. Exposure scenarios were developed for typical exposures likely to occur at this site, taking into account that it is reasonable that certain populations, such as recreational visitors or commercial/industrial workers, would be exposed to

**WHAT IS HUMAN HEALTH RISK AND HOW IS IT CALCULATED?**

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

*Hazard Identification:* In this step, the Contaminants of Potential Concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

*Exposure Assessment:* In this step, the different exposure pathways through which people might be exposed to the contaminants in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a “reasonable maximum exposure” (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

*Toxicity Assessment:* In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals can cause both cancer risks and non-cancer health hazards.

*Risk Characterization:* This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a $10^{-4}$ cancer risk means a “one-in-ten-thousand excess cancer risk”; or one additional cancer may be seen in a population of 10,000 people because of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of $10^{-4}$ to $10^{-6}$, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a “hazard index” (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses (RfDs). The key concept for a non-cancer HI is that a threshold (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is $10^{-6}$ for cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a $10^{-4}$ cancer risk or an HI of 1 are typically those that will require remedial action at the site and are referred to as COCs in the ROD.

more than one area. The attached table, Table 1, presents the cancer risks and noncancer hazards estimated for populations in the HHRA that exceed threshold levels. This table includes what media and COCs were identified in each exposure area. A full discussion of the HHRA evaluation and conclusions is presented in the 2009 HHRA Report.

***Ecological Risk Assessment***

The Subsite BERA identified current and future habitat use and potential ecological receptors at the Subsite. Based on the ecological receptors identified, unacceptable risk was posed by the following COCs by receptor for each Exposure Area:

**Main Subsite Exposure Area**, including the Lakeshore Area, Penn-Can Property, Railroad Area, delineated wetlands not contiguous with Onondaga Lake, AOS #1, and AOS #2:

- Potential risk to terrestrial plants is posed by metals (primarily chromium, mercury, and silver) via exposure to surface soils.
- Potential risk to soil invertebrates is posed by chromium via eco exposure to surface soils.
- Potential risk to aquatic organisms is posed by six inorganics, total PCBs, one pesticide, four SVOCs and nine VOCs based upon a comparison of groundwater data to surface water values protective of aquatic organisms.
- Potential risk to fish is posed by seven inorganics, total PCBs, two pesticides, twelve SVOCs and thirteen VOCs based upon a comparison of groundwater data to surface water values protective of the fish community.
- Potential risk to upper trophic level receptors, insectivorous birds and mammals and carnivorous birds and mammals, is determined via food chain exposure.

**WHAT IS ECOLOGICAL RISK AND HOW IS IT CALCULATED?**

A Superfund baseline ecological risk assessment is an analysis of the potential adverse health effects to biota caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current and future land and resource uses. The process used for assessing site-related ecological risks includes:

*Problem Formulation:* In this step, the contaminants of potential ecological concern (COPECs) at the site are identified. Assessment endpoints are defined to determine what ecological entities are important to protect. Then, the specific attributes of the entities that are potentially at risk and important to protect are determined. This provides a basis for measurement in the risk assessment. Once assessment endpoints are chosen, a conceptual model is developed to provide a visual representation of hypothesized relationships between ecological entities (receptors) and the stressors to which they may be exposed.

*Exposure Assessment:* In this step, a quantitative evaluation is made of what plants and animals are exposed to and to what degree they are exposed. This estimation of exposure point concentrations includes various parameters to determine the levels of exposure to a chemical contaminant by a selected plant or animal (receptor), such as area use (how much of the site an animal typically uses during normal activities); food ingestion rate (how much food is consumed by an animal over a period of time); bioaccumulation rates (the process by which chemicals are taken up by a plant or animal either directly from exposure to contaminated soil, sediment or water, or by eating contaminated food); bioavailability (how easily a plant or animal can take up a contaminant from the environment); and life stage (e.g., juvenile, adult).

*Ecological Effects Assessment:* In this step, literature reviews, field studies or toxicity tests are conducted to describe the relationship between chemical contaminant concentrations and their effects on ecological receptors, on a media-, receptor- and chemical-specific basis. In order to provide upper and lower bound estimates of risk, toxicological benchmarks are identified to describe the level of contamination below which adverse effects are unlikely to occur and the level of contamination at which adverse effects are more likely to occur.

*Risk Characterization:* In this step, the results of the previous steps are used to estimate the risk posed to ecological receptors. Individual risk estimates for a given receptor for each chemical are calculated as a hazard quotient (HQ), which is the ratio of contaminant concentration to a given toxicological benchmark. In general, an HQ above 1 indicates the potential for unacceptable risk. The risk is described, including the overall degree of confidence in the risk estimates, summarizing uncertainties, citing evidence supporting the risk estimates and interpreting the adversity of ecological effects.

  - Risk to insectivorous birds is primarily associated with barium, chromium, mercury, methyl mercury, BEHP, hexachlorobenzene, pyrene and dioxins[5].
  - Risk to insectivorous mammals is primarily associated with cadmium, methylmercury and hexachlorobenzene.
  - Risk to carnivorous mammals is primarily associated with chromium and dioxins.
  - Risk to carnivorous birds is primarily associated with the avian dioxin equivalent.

As discussed in the FS Report (also see Figure 4), the remedial activities associated with the West Wall IRM, East Wall IRM, Upper Harbor Brook IRM, and Outboard Area IRM as well as the *Wastebed B/Harbor Brook Material Management, Grading, and Disposal Plan* have mitigated risks posed to ecological receptors associated with exposure to select areas of surface soil.

**Aquatic Exposure Area**, including the former East Flume, Harbor Brook, and Subsite drainage ditches:

- Aquatic organisms in the East Flume had no risk associated with exposure to surface water. In the Harbor Brook/Subsite ditches area six metals, four SVOCs and three VOCs posed unacceptable risk due to exposure to surface water.
- Potential risk to Harbor Brook/Subsite ditches benthic invertebrates via exposure to sediment was not presented by any particular constituent or category of constituents, as there were exceedances of screening criteria in all categories of constituents, while potential risk to East Flume benthic invertebrates via exposure to sediment was presented by PAHs.

[5] Dioxins refer to a group of compounds that include 2,3,7,8-tetrachlorodibenzo-para-dioxin, as well as other dioxin-like compounds that have similar chemical structures and toxicological characteristics.

- Potential risk to fish in Harbor Brook/Subsite ditches is primarily associated with dissolved levels of pesticides and SVOCs (mostly PAHs) in surface water and multiple categories of constituents in sediment. In the former East Flume, potential risk to fish was posed by PAHs in sediment.
- There is no unacceptable risk for piscivorous birds based on food chain exposure.
- Potential risk to piscivorous mammals is presented by dibenzo(a,h)anthracene and total PCBs via food chain exposure.

Potential ecological risks associated with the former East Flume, Harbor Brook, and Subsite drainage ditches have been mitigated by Subsite IRMs. As discussed in the FS Report (also see Figure 4)**,** the East Flume IRM, West Wall IRM, East Wall IRM, and Upper Harbor Brook IRM have mitigated (or will mitigate) risks posed to ecological receptors associated with exposure to surface water and sediment in Harbor Brook along the Subsite and in Subsite drainage ditches. Additionally, risks posed to ecological receptors resulting from exposure to shallow and intermediate groundwater (via discharge to surface water) has been mitigated by the Upper Harbor Brook IRM. However, conditions which could potentially result in a return to unacceptable risks for sediment or surface water in Harbor Brook and/or the Subsite drainage ditches may occur should operation and maintenance (O&M) activities for the IRMs be discontinued.

**Lakeshore Wetland Exposure Area**, including delineated wetlands located contiguous with Onondaga Lake on the Lakeshore Area:

- Potential risks to terrestrial plants is posed by metals.
- Potential risk to soil invertebrates is posed by metals, two SVOCs, and two VOCs.
- Potential risk to aquatic organisms is posed by dissolved metals and SVOCs based upon a comparison of groundwater data to surface water values protective of aquatic organisms.
- Potential risk to benthic invertebrates via exposure to sediment is demonstrated by exceedances of screening criteria in multiple categories of constituents.
- Potential risk to fish is presented by metals and SVOCs in sediments and based upon a comparison of groundwater data to surface water values protective of the fish community.
- Overall risk for piscivorous birds is based on food chain exposure and associated with risk to metals, pesticides, and SVOCs.
- Potential risk to piscivorous mammals is posed primarily by PAHs and BEHP via food chain exposure.

As discussed in the FS Report (also see Figure 4), the remedial activities associated with the West Wall IRM, East Wall IRM, Upper Harbor Brook IRM, and Outboard Area IRM have mitigated (or will mitigate) risks posed to ecological receptors associated with exposure to wetlands contiguous with Onondaga Lake.

A full discussion of the BERA evaluation and conclusions is presented in the 2011 BERA Report.

***<u>Summary of Human Health and Ecological Risks</u>***

The results of the human health risk assessment indicate that the contaminated soil, indoor air, and groundwater present current and/or potential future unacceptable exposure risk and the ecological risk assessment indicates that the contaminated soils pose an unacceptable exposure risk. While some of the risks associated with contaminated soil have been mitigated in part by the implemented IRMs, the calculated risks are still considered to be valid as the IRM components relating to placement of clean cover materials did not address all site areas and are not necessarily final actions. Moreover, while potential ecological and human health risks associated with Harbor Brook and Subsite drainage ditches have been mitigated by Subsite IRMs, conditions which could potentially result in a return to unacceptable risks for sediment or surface water in Harbor Brook and/or the Subsite drainage ditches may occur should O&M activities for the IRMs be discontinued.

Based upon the results of the RI and the risk assessments, EPA and NYSDEC have determined that actual or threatened releases of hazardous substances from the Subsite, if not addressed by the preferred remedy or one of the other active measures considered, may present a current or potential threat to human health and the environment.

### *REMEDIAL ACTION OBJECTIVES*

Remedial Action Objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels established using the risk assessments. The following RAOs have been established for the Subsite:

- Prevent, or reduce to the extent practicable, ingestion/direct contact with contaminated soil/fill material to be protective under the current and reasonably anticipated future land uses.
- Prevent, or reduce to the extent practicable, inhalation of or exposure to contaminants volatilizing from contaminated soil/fill material and groundwater, and unacceptable inhalation exposure associated with soil vapor. If buildings are constructed at the Subsite, mitigate impacts to public health resulting from known, or potential, soil vapor intrusion into buildings at the Subsite.
- Prevent, or reduce to the extent practicable, potential unacceptable risks to human health associated with ingestion of shallow and intermediate groundwater with contaminant levels exceeding drinking water standards.
- Restore groundwater outside of the WMA to levels that meet state and federal standards within a reasonable time frame.
- Prevent, or reduce to the extent practicable, potential unacceptable risks to human health associated with contact with, or inhalation of, volatiles from contaminated shallow and intermediate groundwater.
- Prevent, or reduce to the extent practicable, the release of Subsite-related contaminants to groundwater, surface water and sediment that may cause unacceptable adverse effects on groundwater, surface water or sediment quality in Harbor Brook or Onondaga Lake.
- Prevent, or reduce to the extent practicable, adverse impacts to biota from ingestion/direct contact with contaminated soil/fill material causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

NYSDEC's SCOs have been identified as remediation goals for soil in an effort to attain these RAOs. SCOs are risk-based criteria that have been developed by the State following methods consistent with EPA's methods/protocols/guidance and they are set at levels consistent with EPA's acceptable levels of risk that are protective of human health, ecological exposure, or the groundwater depending upon the existing and anticipated future use of the Subsite. While the land use of the Subsite has historically been industrial, current and anticipated future uses of some areas could include commercial or recreational use. Groundwater remedial goals are the NYS AWQS. IRMs to address surface water and sediment throughout the Subsite have eliminated exposure to these media. Cleanup goals were not specifically developed for them but maintenance of the IRMs is expected to achieve the RAO.

## SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA § 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA § 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA § 121(d)(4), 42 U.S.C. § 9621(d)(4).

Based on anticipated future development of the Subsite, expectations of the reasonably-anticipated land use, as described above, were considered in the FS to facilitate the development of evaluation of remedial alternatives. The reasonably anticipated land use includes passive recreational use for the Lakeshore area, and industrial/commercial use and/or to provide additional State Fair parking for portions of the property south of I-690 (Penn-Can Property, Railroad Area).

All the alternatives, other than Alternative 1 - No Further Action, include the continuation of the O&M for the IRMs that have been implemented at the Subsite, other than the East Wall and Outboard Area IRMs.[6] Maintenance for the IRMs would include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance or re-application of vegetation in areas of non-survivorship.[7]

The remedial alternatives are as follows:

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[6] As noted in the discussion under Interim Remedial Measures, the East Wall and the Outboard Area IRMs and required O & M were documented in RADs issued in 2011 and 2012, respectively.
[7] The annual O&M cost estimates are included in the cost estimates for each of the action alternatives.

**Alternative 1 - No Further Action**

The Superfund program requires that the "no action" alternative be considered as a baseline for comparison with the other alternatives. The no further action remedial alternative would not include any additional remedial measures that address the soil/fill material and shallow and intermediate groundwater contamination at the Subsite.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated media.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $0 |
| Annual O&M Cost: | $0 |
| Present-Worth Cost: | $0 |

**Alternative 2 –Cover System with Shallow/Intermediate Groundwater Restoration via MNA at POC**

Alternative 2 includes the placement of a cover system with vegetation enhancement on surface soil that exceed the SCOs for commercial or industrial reasonably-anticipated future land uses at the Subsite (see Figure 6). This alternative also includes the continuation of O&M for IRMs that have been implemented at the Subsite and an evaluation of the presence of DNAPL at the Penn-Can Property. Following the completion of the DNAPL investigation, if recoverable DNAPL is encountered, DNAPL would be recovered using deep recovery wells or other applicable methods.

A minimum 1-foot thick soil/granular cover (or maintained paved surfaces and buildings) over approximately 35 acres for the purposes of minimizing erosion and mitigating potentially unacceptable exposure of human receptors to constituents exceeding NYCRR Part 375 commercial or industrial SCOs in surface soil/fill material. The need for a demarcation layer between the soil cover and the underlying substrate would be evaluated during the design. Additional actions, such as stabilization or removal, would be incorporated, if necessary, in the areas where surficial tar material is present, such that this material is effectively addressed to meet the RAOs. The cover system and vegetation enhancements would require routine maintenance and inspections to maintain cover integrity.

Where SCOs are not exceeded in surface soil but where they are exceeded at depth (approximately 21 acres), vegetation enhancement would be implemented to supplement the existing vegetation and to reduce erosion of surface soil/fill material. Sampling would be performed to determine the appropriate cover and its limits.

Fill material brought to the Subsite would need to meet the requirements for the identified Subsite use (*e.g.,* commercial or industrial). Native species would be used for the vegetative component of covers. To develop cost estimates, the seed application is anticipated to consist of a grassland seed mix native to New York State and was selected for its ability to attain relatively high growth rates and ecological function.

Structures, such as buildings, pavement, or sidewalks, as part of future development, could serve as acceptable substitutes for any of the vegetated covers described above.

Clean fill staging areas, which supported the IRMs and Onondaga Lake site remediation projects, were constructed at the Subsite. Restoration and final cover thicknesses would be evaluated and existing cover thickness may be supplemented with additional cover material to meet the 1-foot minimum thickness required for the intended use of these areas (*e.g.,* commercial, industrial).

Because Subsite development plans are not determined for portions of the Subsite, the boundaries of the covers are conceptual and presented for cost estimation purposes. A portion of the Penn-Can Property may be used for overflow parking for the New York State Fairgrounds, while an approximate ¾-mile extension of the “Onondaga Loop the Lake” trail will cross a portion of the Lakeshore Area and AOS #1. The extent of covers would be revisited during the design phase. The conceptual extent of the Subsite cover system is depicted on Figure 6.

Institutional controls in the form of environmental easements and/or restrictive covenants would be used to limit land use to commercial (including passive recreational)/industrial, as appropriate, prevent the use of groundwater without approved treatment and require that any intrusive activities in areas where contamination remains would be conducted in accordance with a NYSDEC-approved SMP, which would include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Subsite and documents the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:

    - o environmental easements and/or restrictive covenants described above
    - o Subsite cover systems (*e.g.,* existing IRM covers) described above
    - o excavation plan which details the provisions for management of future excavations in areas of remaining contamination
    - o descriptions of the provisions of the institutional controls, including any land use or groundwater use restrictions
    - o provision that future on-Subsite occupied buildings should include either vapor intrusion sampling and/or installation of mitigation measures, if necessary
    - o provisions for the management and inspection of the identified engineering controls
    - o maintaining Subsite access controls and NYSDEC notification
    - o steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The final monitoring program would be established during the design.

The alternative includes continued monitoring and maintenance associated with IRM elements noted above which pertain to the Lakeshore Area (including Wastebed B, the former East Flume, DSA #1, DSA#2, and the I-690 Drainage Ditch), the Penn-Can Property, the Railroad Area, AOS #2, and Harbor Brook (*e.g.,* West Barrier Walls and Upper Harbor Brook IRMs).

As summarized in Section 2.2 of the FS Report, the vertical hydraulic conductivity of the Solvay waste unit present at the Subsite is generally less than $1 \times 10^{-5}$ centimeters per second (cm/sec) (and the geometric mean of the vertical hydraulic conductivity is less than $1 \times 10^{-5}$ cm/sec). The proposed cover materials in combination with the underlying soil/fill material (*e.g.,* Solvay waste) and continued O&M of the groundwater collection system for Subsite groundwater would meet the requirements for containment under RCRA Subtitle D, which would be an ARAR for this action.

This alternative includes restoration of shallow/intermediate groundwater at the POC via MNA. An evaluation of the shallow and intermediate groundwater using data collected in 2017 to support an investigation of deep groundwater indicated that natural attenuation is occurring within the shallow and intermediate groundwater. Based on multiple lines of evidence, degradation of groundwater organic constituents is occurring in shallow and intermediate groundwater. Further evaluation of MNA would need to be conducted as part of the preliminary remedial design and/or O&M.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time for this alternative is 1 to 2 years.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $9,600,000 |
| Annual O&M Cost: | $586,000 |
| Present-Worth Cost: | $16,900,000 |

**Alternative 3 – Enhanced Cover System with Wetland Construction/Restoration and Shallow/Intermediate Groundwater Restoration via MNA at POC**

Alternative 3 includes all the components of Alternative 2 except the cover systems would also be applicable for surface soil that exceed the SCOs for commercial, industrial or ecological reasonably-anticipated future land uses at the Subsite with the addition of the construction/restoration of a wetland near wetland area WL2 on the northeastern shoreline of Wastebed B (see Figure 7).

The cover systems would consist of a minimum of 1-foot with up to 2-feet thick soil/granular cover (or maintained paved surfaces and buildings), applied over approximately 35 acres for the purposes of minimizing erosion and mitigating potentially unacceptable exposure of human and/or ecological receptors to constituents exceeding SCOs in soil/fill material. The extent, thickness, and permeability of covers would be revisited during the design phase and/or during site management, if site uses change, as necessary.

Wetland construction/restoration to mitigate for wetland acreage lost as a result of implementation of the Wastebed B/Harbor Brook IRM would total approximately 1 acre and include the installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material to reduce infiltration and discharge of groundwater to surface water during seasonally high groundwater levels concurrent with high lake levels.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time of this alternative is 2 to 3 years.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $11,800,000 |
| Annual O&M Costs: | $591,000 |
| Present-Worth Cost: | $19,100,000 |

**Alternative 4 – Enhanced Cover System with Wetland Construction/Restoration, *In-Situ* Treatment and Shallow/Intermediate Groundwater Restoration via MNA at POC**

Alternative 4 is similar to Alternative 3, except for the use of *in-situ* treatment instead of the installation of a low permeability liner on the northeastern shoreline of Wastebed B beyond the wetland footprint within an area of DNAPL-impacted soil/fill material (see Figure 8).

*In-situ* treatment of DNAPL-impacted soil/fill material would be completed over an approximately 2.2-acre area coinciding with the footprint and perimeter of the proposed area of wetland construction/restoration. For cost estimation purposes, *in-situ* geochemical stabilization (ISGS) has been assumed. ISGS provides partial mass destruction through chemical oxidation while also generating mineral precipitates to encapsulate remaining NAPL-impacted surfaces to reduce the mobility of remaining contaminants. The reagents would be applied by soil mixing to a depth of 10 feet bgs, based on the approximate extent of DNAPL-impacted soil/fill material. Treatment with ISGS is estimated to take approximately one month for stabilization to occur, after which wetland construction could be performed.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time of this alternative is 2 to 3 years.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $19,600,000 |
| Annual O&M Costs: | $591,000 |
| Present-Worth Cost: | $26,900,000 |

**Alternative 5 – Partial Excavation with Off-Site Disposal and Shallow/Intermediate Groundwater Restoration via MNA at POC**

Alternative 5 includes the mechanical excavation of the soil/fill material that is above Unrestricted Use SCOs to depths ranging from 14 to 45 feet below grade depending on the area. No soil removal is assumed within 30 feet of I-690, State Fair Boulevard, and the CSX railroad line traversing the Subsite. Excavation would be conducted to achieve a minimum temporary slope of 1:2 where possible, with sheet piling installed along select portions such as the Lakeshore Area and removal of the IRM collection systems (*e.g.,* Upper Harbor Brook, East and West Walls) as necessary. Due to the required setbacks and sloping from adjacent features (*e.g.*, railways and roadways) some impacted material would remain following excavation. The excavated material would be transported off-Subsite for treatment/disposal. The excavated areas would be restored to the current grades and revegetated. The areas in the vicinity of I-690, State Fair Boulevard, the CSX railroad line traversing the

Subsite, and various major utility corridors that exceed Unrestricted Use SCOs would be addressed with covers which meet RCRA Subtitle D cover requirements. Restoration would also include the reinstallation of the East Wall and West Wall collection systems, Harbor Brook surface water conveyance structures, and repair of a portion of the Onondaga Lake Remedy to support the effectiveness of the Onondaga Lake remedy and to maintain Subsite stability as noted below. This alternative also includes the removal of the staged and capped materials on the Lakeshore area. This alternative is depicted on Figure 9.

The installation of temporary bulkhead walls within Onondaga Lake (and a temporary water treatment plant) would be necessary to support excavation activities and provide for water control in the excavation when excavating below lake level. Excavation of soil/fill material from the Lakeshore Area also necessitates the measures to provide for continuous service to three Onondaga County sanitary sewers. For cost estimation purposes, it is assumed temporary bypass sewers would need to be installed during excavation activities, and replaced following excavation.

For cost estimation purposes, it was assumed a total estimated 3.1 million cy of excavated soil/fill material would be transported off-Subsite for non-hazardous waste disposal. In addition, a volume of 75,000 cy was assumed to require off-Subsite incineration due to the presence of DNAPL. Based on a daily production rate of 2,400 cy per day for 10 months of the year; it is estimated that the material would be shipped off-Subsite in three to four construction seasons resulting in approximately 185,000 truckloads (145 truckloads per day).

Clean backfill would be transported via trucks from an off-Subsite borrow source to the Subsite, requiring an estimated 2 million cy (approximately 135,000 truck trips), to restore excavated areas to near existing grades. It is also assumed that the barrier walls and collection systems would be replaced for groundwater collection and maintenance of Subsite stability.

For cost estimation purposes, it is assumed that the Railroad and Penn-Can areas would be restored to existing grades, but that the lakeshore would be filled only to the extent necessary to suitably support I-690, utilities and allow for the reinstallation of the groundwater collection system components. It is assumed that in-lake capping would be necessary to repair (required in connection with the bulkhead barrier installation and subsequent removal) and expand the existing in-lake cap for the increased area requiring approximately 350,000 cy of capping materials (23,000 truck trips). Onondaga County sanitary sewers would also be replaced as part of restoration activities following excavation.

This alternative would also include an evaluation for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property and monitoring, consistent with the remedial components described above in Alternative 2. If feasible, recoverable DNAPL would be collected and transported off-Subsite for treatment/disposal.

This alternative includes restoration of shallow/intermediate groundwater at the POC via MNA. Based on multiple lines of evidence, degradation of organic constituents is occurring in the shallow and intermediate groundwater via natural attenuation and degradation (e.g., biodegradation). Further evaluation of MNA would need to be conducted as part of the preliminary remedial design and/or O&M.

Long-term maintenance of the vegetated areas would be included. In areas where materials exhibiting concentrations greater than SCOs remain, institutional controls (*e.g.,* environmental easements, deed restrictions, and environmental notices), an SMP, and periodic reviews consistent with those described above in Alternative 2 would be necessary.

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

The estimated construction time of this alternative is 4 years.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $1,161,500,000 |
| Annual O&M Costs: | $538,000 |
| Present-Worth Cost: | $1,168,200,000 |

**Alternative 6 – Full Excavation with Off-Site Disposal and Shallow/Intermediate Groundwater Restoration via MNA**

This alternative represents restoration to pre-disposal conditions through full removal of all soil/fill material above Unrestricted

Use SCOs and would remove portions of I-690, State Fair Boulevard, the CSX railroad line, IRMs (*e.g.,* Upper Harbor Brook, East and West Walls) as necessary and various major utility corridors to facilitate removal of the underlying contaminated soil/fill. Excavated material would be transported off-Subsite for treatment/disposal. Restoration would include backfill and restoration to the existing areas and grades and include rebuilding the removed portions of the highway, rail systems, and utility corridors. Restoration would also include reinstallation of the East Flume IRM sewer maintenance and East Wall and West Wall collection systems, Harbor Brook surface water conveyance structures, and repair of a portion of the Onondaga Lake Remedy to support the effectiveness of the Onondaga Lake remedies and maintain Subsite stability as noted below. Long-term maintenance of vegetated areas would be included. This alternative also includes the removal of the staged and capped materials on the Lakeshore area. This alternative is depicted on Figure 10.

As necessary, institutional controls, an SMP, and periodic reviews, consistent with those described above in Alternative 2, would also be included.

Given the volume of traffic on this portion of I-690 (estimated at over 50,000 cars each day by the New York State Department of Transportation), re-routing to local streets for the duration of construction is not anticipated to be feasible or permitted. Therefore, it is anticipated that the construction of a temporary highway bypass over the Penn-Can Property would be required. An approximately one-mile section of I-690 and State Fair Boulevard has been assumed for removal and reinstallation with installation and subsequent removal of an approximately 2-mile temporary I-690 bypass, resulting in an additional quantity of approximately 180,000 tons of construction and demolition (C&D) material for disposal. Additionally, it is assumed that approximately 3 miles of railway would be rerouted during construction with the existing tracks removed as part of excavation.

Installation of temporary bulkhead walls within Onondaga Lake (and a temporary water treatment plant) would be necessary to support excavation activities and provide for water control in the excavation when excavating below lake level. Excavation of soil/fill material from the Lakeshore Area also necessitates the measures to provide for continuous service to three Onondaga County sanitary sewers. For cost estimation purposes, it is assumed temporary bypass sewers would need to be installed during excavation activities, and replaced following excavation.

For cost estimation purposes, it was assumed a total estimated 3.4 million cy of excavated soil/fill material would be transported off-Subsite for non-hazardous disposal. In addition, a volume of 75,000 cy was assumed to require off-Subsite incineration due to the presence of DNAPL. It was also assumed that 180,000 tons of C&D material would be transported off-Subsite for disposal resulting from roadway and railway demolition.

Based on a daily production rate of 2,400 cy per day for 10 months of the year; it is estimated that the material would be shipped off-Subsite in approximately four construction seasons resulting in approximately 210,000 truckloads (145 truckloads per day).

Clean backfill would be transported via trucks from an off-Subsite borrow source to the Subsite, requiring an estimated 2.3 million cy (approximately 150,000 truck trips), to restore excavated areas to near existing grades. It is also assumed that the barrier and collection systems would be replaced for groundwater collection and maintenance of Subsite stability.

For cost estimation purposes, it is assumed that the Railroad and Penn-Can areas would be restored to existing grades, but that the lakeshore would be filled only to the extent necessary to suitably support I-690, utilities and allow for the reinstallation of the groundwater collection system components. It is assumed that in-lake capping would be necessary to repair (required in connection with the bulkhead barrier installation and subsequent removal) and expand the existing in-lake cap for the increased area requiring approximately 350,000 cy of capping materials (23,000 truck trips). Onondaga County sanitary sewers would also be replaced as part of restoration activities following excavation.

I-690 and State Fair Boulevard would be rebuilt in the existing alignments, resulting in an additional approximately 8,000 truck trips to deliver the approximately 120,000 cy of materials to restore those facilities to match adjacent grades. Onondaga County sanitary sewers would also be replaced as part of restoration activities following excavation. Because this alternative would result in certain constituents remaining above levels that allow for unlimited use and unrestricted exposure, institutional controls would be required.

This alternative would also include an evaluation for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property and monitoring, consistent with the remedial components described above in Alternative 2.

This alternative includes restoration of shallow/intermediate groundwater within the Subsite boundary and beyond the POC, but not within the ILWD. The basis for MNA is supported by an evaluation of the shallow and intermediate groundwater using data collected in 2017 to support an investigation of deep groundwater. Based on multiple lines of evidence, degradation of organic constituents is occurring in shallow and intermediate groundwater. Further evaluation of MNA would need to be conducted as part of the preliminary remedial design and/or O&M.

Implementation of this alternative is estimated to require 6 construction seasons.

The estimated capital, annual, and present-worth costs of this alternative are as follows:

| | |
|---|---|
| Capital Cost: | $1,303,500,000 |
| Annual O&M Costs: | $538,000 |
| Present-Worth Cost: | $1,310,200,000 |

## COMPARATIVE ANALYSIS OF ALTERNATIVES

The detailed analysis consists of an assessment of the individual alternatives against each of the nine evaluation criteria (see box below) and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

A comparative analysis of these alternatives based upon the evaluation criteria noted below follows.

| NINE EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES |
|---|
| **Overall protection of human health and the environment** determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment. |
| **Compliance with ARARs** evaluates whether the alternative would meet all the applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements that pertain to the site, or provide grounds for invoking a waiver. |
| **Long-term effectiveness and permanence** considers the ability of an alternative to maintain protection of human health and the environment over time. |
| **Reduction of toxicity, mobility, or volume through treatment** is the anticipated performance of the treatment technologies an alternative may employ. |
| **Short-term effectiveness** considers the period of time needed to implement an alternative and the risks the alternative may pose to workers, residents, and the environment during implementation. |
| **Implementability** is the technical and administrative feasibility of implementing the alternative, including the availability of materials and services. |
| **Cost** includes estimated capital and annual O&M costs, as well as present-worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent. |
| **State acceptance** considers whether NYSDOH (the support agency for NYSDEC) concurs with, opposes, or has no comments on the preferred remedy. |
| **Community acceptance** will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Comments received on the Proposed Plan are an important indicator of community acceptance. |

### Overall Protection of Human Health and the Environment

Alternative 1 would not provide protection of human health and the environment. Alternatives 2, 3 and 4 provide protectiveness through institutional controls, monitoring, and soil covers. As described below, Alternatives 3 and 4 would also achieve protectiveness through added thickness of covers. Alternatives 2, 3, and 4 include implementation of a soil/granular or asphalt cover on the Penn-Can Property, with long-term isolation of underlying impacted soil/fill material and addressing surficial tar material. Furthermore, Alternatives 3 and 4 include targeted implementation of a low permeability cover and *in-situ* treatment on the northeastern Lakeshore Area, respectively, for added protection of the environment. Alternatives 5 and 6 provide protectiveness through institutional controls and soil/fill material removal.

Alternatives 2 through 6 would satisfy the threshold criteria by providing protection of human health and the environment and by addressing RAOs. Alternatives 2 through 4 are consistent with current, intended, and reasonably anticipated future use of the Subsite. Alternatives 5 and 6 would support current, intended, and reasonably anticipated future land use; however, they would present significant short and long-term impacts to the surrounding community and result in substantial environmental impacts (*e.g.,* heavy truck traffic, significant rerouting of traffic, noise and emissions). While Alternative 2 would provide protectiveness of human health and the environment and is consistent with current, intended and reasonably anticipated future use of the Subsite, the added cover thickness and low permeability liner installation on the northeastern portion of the Lakeshore Area in Alternative 3 would provide added protectiveness. Alternative 4 would provide equal protectiveness to Alternative 3; however, as summarized below, with added cost and implementation challenges associated with *in-situ* ISGS on the northeastern Lakeshore Area.

**Compliance with ARARS**

Chemical-, location-, and action-specific ARARs identified for consideration are summarized in Table 3-1 of the *Revised FS Report*. Consistent with the NCP preamble that indicates that for groundwater "remediation levels generally should be attained throughout the contaminant plume, or at and beyond the edge of the waste management area when waste is left in place", attainment of chemical-specific groundwater ARARs is at the edge of a WMA. Thus, the POC for this Subsite is the northern boundary of the adjacent ILWD. The Subsite area is part of a WMA because the waste is a solid waste (*e.g.,* Solvay waste) containing COCs and would meet the requirements for containment under RCRA Subtitle D, which would be an action-specific ARAR under Alternatives 2 through 5. As summarized in Section 2.2 of the FS Report, the vertical hydraulic conductivity of the Solvay waste unit present at the Subsite is generally less than 1 x $10^{-5}$ cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than 1 x $10^{-5}$ cm/sec). The proposed cover materials in combination with the underlying soil/fill material (*e.g.,* Solvay waste) and continued O&M of the groundwater collection and treatment system for Subsite groundwater would meet the requirements for containment under RCRA Subtitle D.

Although off-Subsite shallow and intermediate groundwater (present under Onondaga Lake) is not currently or anticipated to be used, it is classified as potable water by the State of New York. Alternative 1 does not provide a means of addressing potential erosion of and exposure to soil/fill material exceeding chemical-specific ARARs in areas not covered by current grading activities nor would they address restoration of shallow/intermediate groundwater. For Alternatives 2, 3, and 4, chemical-specific ARARs (*e.g.,* SCOs) are addressed through limiting potential for exposures to soil/fill material exceeding chemical-specific ARARs through cover systems, an SMP, monitoring, institutional controls, and continued O&M of IRMs. Alternatives 2 through 6 address DNAPL that may be recoverable (potential principal threat waste), through DNAPL monitoring and recovery. Recovered DNAPL would be sent off-Subsite for treatment/disposal consistent with the preference for treatment of principal threat waste under the NCP. In addition to the measures included in Alternative 2, Alternatives 3 and 4 include enhanced cover systems, while Alternative 3 includes focused implementation of a low permeability cover (northeastern Lakeshore Area) and Alternative 4 includes focused *in-situ* treatment (northeastern Lakeshore Area) to address chemical-specific ARARs. Alternatives 5 and 6 address chemical-specific ARARs through removal of soil/fill material.

No action- or location-specific ARARs were identified for Alternative 1. Institutional controls would be implemented in Alternatives 2 through 6 in general conformance with NYSDEC's DER-33[8] guidance. Additionally, cover systems in Alternatives 2, 3, and 4 would prevent erosion and exposure to soil/fill material. Cover systems would be implemented in general conformance with NYSDEC's DER-10[9] guidance. Construction and O&M activities in Alternatives 2 through 6 would be conducted in compliance with OSHA requirements. Procedures would be implemented to adhere to the location-specific ARARs related to federal and state requirements for cultural, archeological, and historical resources. Additionally, proposed actions would be conducted in a manner consistent with Fish and Wildlife Coordination Act requirements for protection of Onondaga Lake. The need for a scope of cultural resources surveys, as required by the National Historic Preservation Act would be evaluated during the remedial design. As necessary, proposed actions under Alternatives 2 through 6 would be implemented in general conformance with state and federal wetland and floodplain assessment requirements. With respect to action-specific ARARs, proposed cover system and excavation activities would be conducted consistent with applicable standards; earth moving/excavation activities would be conducted consistent with air quality standards; transportation and disposal activities would be conducted in accordance with applicable State and Federal requirements, by licensed and permitted haulers.

**Long-Term Effectiveness and Permanence**

Alternative 1 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential exposure to contaminants. Alternatives 2 through 6 would provide long-term effectiveness and permanence. Residual risks associated with Alternatives 2 through 4 are adequately and reliably addressed through cover systems and institutional controls. In addition, continued operation of the DNAPL and groundwater collection systems are adequate and reliable methods of providing long-term effectiveness and permanence with respect to DNAPL and groundwater impacts from the Subsite. Alternatives 2, 3, and 4 have similar long-term fuel/energy consumption, greenhouse gas emissions, and impacts to water, ecology, workers or the community associated with long-term maintenance of the remedies. Alternatives 5 and 6 provide for the most reliable long-term effectiveness and permanence through removal.

Each of the action alternatives offers long-term sustainability, although construction of Alternatives 5 and 6 would result in significantly greater greenhouse gas emissions than the other alternatives. Long-term O&M requirements in Alternatives 2

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[8] See https://www.dec.ny.gov/docs/remediation_hudson_pdf/der33.pdf

[9] See https://www.dec.ny.gov/regulations/67386.html

through 4 would result in minimal impact to the environment. Consistent with NYSDEC and EPA policies on green remediation, sustainability considerations alone should not be used to justify implementation of a no further action alternative or a less comprehensive alternative.

Conditions such as lake flooding associated with spring thaw events have occasionally inundated the East and West Barrier Wall collection trenches with additional water in the area where the trenches meet. Also, periods of significant precipitation have at times contributed additional water to the systems, causing water to pool behind the barrier walls, resulting in increased water in the trenches. The increased water in the collection systems adversely impacts their operation and effectiveness. The installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material under Alternative 3 would significantly reduce the frequency of these increased water conditions in the trenches and therefore provide greater long-term effectiveness and permanence than would Alternatives 2, 4, 5, and 6.

**Reduction in Toxicity, Mobility, or Volume Through Treatment**

There would be no reduction in toxicity, mobility, or volume in soil/fill material under Alternative 1. Alternatives 2 through 6 would reduce the mobility of coal tar-like DNAPL primarily found on the Penn-Can property and downgradient at Wastebed B through its recovery and treatment. Alternative 4 provides reduction in toxicity, mobility, and volume through treatment of a targeted area of stained soil containing PAHs associated with AOS #1 and wetland area WL2. Both the coal tar-like DNAPL and DNAPL-stained soil areas may exhibit characteristics of principal threat waste. Alternatives 5 and 6 would reduce mobility of COCs in soil/fill material through excavation of the material, and depending on the nature of the waste, disposal off-Subsite may require treatment.

**Short-Term Effectiveness**

Alternative 1 does not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to remediation workers or the community because of its implementation. Worker and community risks during remedy implementation are marginally greater for Alternatives 3 and 4 as compared to Alternative 2. The added risks to workers and the community and the additional significant traffic impacts to the community make Alternatives 5 and 6 a much less effective means of attaining RAOs as compared to the containment Alternatives 2 and 3, or the *in-situ* treatment associated with Alternative 4. The risks to remediation workers and nearby residents under Alternatives 2 through 6 would be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment. The added risks to workers and the community, the added duration to achieve RAOs, significant traffic impacts to the community, and significantly greater environmental footprint make Alternatives 5 and 6 a much less effective means of attaining RAOs as compared to the other alternatives.

Alternatives 5 and 6 would result in significant truck traffic and related noise. Alternatives 5 and 6 would require the off-Subsite transport of over 185,000 and 210,000 truckloads, respectively, of contaminated material and which would potentially adversely affect local traffic and may pose the potential for traffic accidents, which in turn could result in releases of hazardous substances. In addition, Alternatives 5 and 6 would require over 150,000 and 180,000 truckloads, respectively, to bring clean fill and cover materials to the Subsite. The estimated number of truck trips required for the off-Subsite removal of excavated material and import of clean fill and other materials under Alternatives 5 and 6 would equate to approximately 1 truck entering or leaving the Subsite every 2 minutes during a 10-hour work day for a period of 4 to 6 years. In addition to the potentially significant adverse effects on local air quality and community traffic patterns, traffic of this magnitude is anticipated to result in significant adverse effects on conditions of roadways.

Because no remedial actions would be performed under Alternative 1, there would be no implementation time. It is estimated that Alternative 2 would require 1-2 years to implement, Alternatives 3 and 4 would require 2-3 years to implement, Alternative 5 would require 4 years to implement, and Alternative 6 would require 6 years to implement.

**Implementability**

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake. Alternatives 2 through 4 can be readily constructed and operated; the materials necessary for the construction of these alternatives are reasonably available. Alternatives 2 through 6 would require coordination with other agencies, including NYSDEC, NYSDOT, NYSDOH, EPA, the Town of Geddes, Onondaga County, property owners, and CSX (for Alternatives 5 and 6). The implementability of soil mixing included in Alternative 4 would need to be evaluated for the Subsite. Alternatives 5 and 6 are significantly more difficult to implement than the other action alternatives. Specifically, there would be significant implementability limitations associated with excavation, transportation, and obtaining appropriate disposal capacity for these very large volumes of material.

In addition, excavation considerations that would impact the implementability of Alternatives 5 and 6 include construction water management, slope stability, and the existing utilities. Specifically:

- o Construction water management would be problematic during excavation since large volumes are anticipated due to the presence of excavations in proximity of Onondaga Lake and Harbor Brook. Construction water treatment capacity is not likely to be available at the Willis Avenue GWTP; therefore, a temporary treatment system would be required.
- o Excavation near the active railroad would require the installation of shoring under Alternative 5. Alternative 6 would require the removal and relocation of the existing CSX railroad line. Excavation near the IRM barrier walls and collection systems at Wastebed B and along Harbor Brook would necessitate the removal and replacement of the collection systems and barrier walls. Also, the excavation of DNAPL to 45 feet bgs may adversely impact the barrier walls, the collection systems and I-690. Installation of sheet piling to support excavation in this area would penetrate the lower clay confining unit and, thus, potentially allow a pathway for the vertical migration of DNAPL.
- o Excavation at Wastebed B and the Penn-Can Property are also anticipated to be significantly limited by two active Onondaga County sewer force mains. In addition, a high-pressure gas line, fiber optic lines, and water lines are present along State Fair Boulevard near the Penn-Can Property.

**<u>Cost</u>**

The estimated present-worth costs were calculated using a discount rate of seven percent and a thirty-year time interval for post-construction monitoring and maintenance period. (Although O&M would continue as needed beyond the thirty-year period, thirty years is the typical period used when estimating costs for a comparative analysis.)

The estimated capital, annual O&M, and present-worth costs using 7% discount factor for each of the alternatives are presented in the table below. The estimated costs for the action alternatives are directly related to the given alternative's corresponding total volumes of soil/fill material to be excavated.

| **Alternatives** | **Capital** | **Annual O&M** | **Total Present Worth** |
|---|---:|---:|---:|
| 1 – No Further Action | $0 | $0 | $0 |
| 2 –Cover System with Shallow/Intermediate Groundwater Restoration via MNA at the POC | $9.6 million | $586,000 | $16.9 million |
| 3 – Enhanced Cover System with Wetland Construction/Restoration and Shallow/Intermediate Groundwater Restoration via MNA at the POC | $11.8 million | $586,000 | $19.1 million |
| 4 – Enhanced Cover System with Wetland Construction/Restoration, *In-Situ* Treatment and Shallow/Intermediate Groundwater Restoration via MNA at the POC | $19.6 million | $591,000 | $26.9 million |
| 5 – Partial Excavation with Off-Site Disposal and Shallow/Intermediate Groundwater Restoration via MNA at the POC | $1.2 billion | $538,000 | $1.2 billion |
| 6 – Excavation with Off-Site Disposal and Shallow/Intermediate Groundwater Restoration via MNA | $1.3 billion | $538,000 | $1.3 billion |

**<u>State Acceptance</u>**

NYSDOH has reviewed this Proposed Plan and concurs with the preferred remedy.

**<u>Community Acceptance</u>**

Community acceptance of the preferred alternative will be addressed in the ROD following review of the public comments received on the Proposed Plan.

## PREFERRED REMEDY

Based upon an evaluation of the various alternatives, NYSDEC and EPA recommend Alternative 3, Enhanced Cover System with Wetland Construction/Restoration, as the preferred alternative. The preferred alternative includes an enhanced cover system with vegetation enhancement and construction/restoration of a wetland (*i.e.,* wetland area WL2) with a low permeability liner on the northeastern shoreline of Wastebed B. A conceptual depiction of the preferred remedy is presented in Figure 7.

The cover systems would consist of a minimum of 1-foot with up to 2-feet thick soil/granular cover (or maintained paved surfaces and buildings), applied over approximately 35 acres for the purposes of minimizing erosion and mitigating potentially unacceptable exposure of human and ecological receptors to constituents exceeding NYCRR Part 375 SCOs in surface soil/fill material. The cover and/or the underlying soil material would meet the Subtitle D permeability standard. The need for a demarcation layer between the soil cover and the underlying substrate would be evaluated during design. In areas where SCOs in surface soil are not exceeded and where existing covers and/or soil fill material meet the Subtitle D permeability standard, vegetation enhancement would be implemented (approximately 21 acres), consistent with Alternative 2, to supplement existing vegetation and to reduce erosion of surface soil/fill material. As necessary, sampling would be performed to determine the appropriate cover. Additional design features would be incorporated (*e.g.,* stabilization, removal), if necessary, in the areas where surficial tar material is present, such that this material is effectively addressed to meet RAOs. The cover system and vegetation enhancements would require routine maintenance and inspection to maintain cover integrity.

The Subsite area is part of a WMA because the waste is a solid waste containing COCs and would meet the requirements for containment under RCRA Subtitle D. The vertical hydraulic conductivity of the Solvay waste unit present at the Subsite is generally less than $1 \times 10^{-5}$ cm/sec (and the geometric mean of the vertical hydraulic conductivity is less than $1 \times 10^{-5}$ cm/sec). The proposed cover materials in combination with the underlying soil/fill material (*e.g.,* Solvay waste) and continued O&M of the groundwater collection and treatment system for Subsite groundwater would meet the requirements for containment under RCRA Subtitle D.

Alternative 3 would also include construction/restoration of a wetland in the vicinity of wetland area WL2 on the northeastern shoreline of Wastebed B. Wetland construction/restoration would total approximately 1 acre and include installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material for the purpose of reducing infiltration and discharge of groundwater to surface water during seasonally high groundwater levels concurrent with high lake levels.

Fill material brought to the Subsite would need to meet the requirements for the identified Subsite use (commercial, industrial or ecological). Native species would be used for the vegetative component of covers. To develop cost estimates, the seed application is anticipated to consist of a grassland seed mix native to New York State and selected for its ability to attain relatively high growth rates and ecological function.

Structures, such as buildings, pavement, or sidewalks, as part of future development, could serve as acceptable substitutes for any of the vegetated cover types described above.

Clean fill staging areas, which supported the IRMs and Onondaga Lake site remediation projects, were constructed at the Subsite. Restoration and final cover thicknesses would be evaluated and existing cover thickness may be supplemented with additional cover material to meet the minimum thickness required for the identified use.

Evidence of DNAPL and stained soils were encountered in soil borings and test pits advanced during the investigations at the Subsite. While off-Subsite DNAPL migration is currently being addressed by IRMs, a PDI would be conducted to evaluate the potential for the presence of recoverable DNAPL in the deep unit on the Penn-Can Property. Following completion of the DNAPL investigation, if recoverable DNAPL is identified, DNAPL would be recovered using recovery wells.

Alternative 3 would include restoration of shallow/intermediate groundwater at the POC via MNA. Based on multiple lines of evidence, degradation of organic constituents is occurring in the shallow and intermediate groundwater via natural attenuation and degradation (e.g., biodegradation). Further evaluation of MNA would need to be conducted as part of the preliminary remedial design and/or O&M.

Because Subsite development plans are not determined for portions of the Subsite, the boundaries of the covers are conceptual (see Figure 7) and presented for cost estimation purposes. A portion of the Penn-Can Property is anticipated to be used for overflow parking for the New York State Fairgrounds, while an approximate ¾-mile extension of the "Onondaga Loop the Lake" trail will cross a portion of the Lakeshore Area and AOS #1. The extent, thickness, and permeability of covers would be revisited during the design phase and/or during site management, if site uses change, as necessary.

Institutional controls in the form of environmental easements and/or restrictive covenants would restrict the land use to commercial (including passive recreational)/industrial use, restrict groundwater use and require that intrusive activities in areas where contamination remains are in accordance with a NYSDEC-approved SMP, which would include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Subsite and details the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:

    - environmental easements and/or restrictive covenants described above
    - Subsite cover systems (*e.g.,* existing IRM covers) described above
    - excavation plan which details the provisions for management of future excavations in areas of remaining contamination
    - descriptions of the provisions of the institutional controls including any land use or groundwater use restrictions
    - provision that future on-Subsite construction should include either vapor intrusion sampling and/or installation of mitigation measures, if necessary
    - provisions for the management and inspection of the identified engineering controls
    - maintaining Subsite access controls and NYSDEC notification
    - steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The final monitoring program would be established during design.

The preferred remedy also includes continued O&M associated with the IRMs that have been implemented at the Subsite. These include the West Wall and Upper Harbor Brook groundwater collection systems and treatment at the Willis Avenue GWTP, and the existing capped areas addressed by the IRMs. Maintenance and monitoring of the Outboard Area IRM is included as part of Onondaga Lake monitoring. O&M of the East Wall IRM would continue pursuant to the 2011 NYSDEC and EPA *East Barrier Wall Interim Remedial Measure, Response Action Document*. Surface water monitoring in Harbor Brook and Subsite ditches would also continue under the Upper Harbor Brook IRM. Maintenance and monitoring for the IRMs would include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for covers may consist of cover repair in areas of disturbance or reapplication of vegetation in areas of non-survivorship.[10]

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Subsite be reviewed at least once every five years.

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy-DER-31[11], and EPA Region 2's Clean and Green Policy[12] would be considered for the preferred remedy to reduce short-term environmental impacts. Green remediation best practices such as the following may be considered:

- Use of renewable energy and/or purchase of renewable energy credits to power energy needs during construction and/or O&M of the remedy
- Reduction in vehicle idling, including both on- and off-road vehicles and construction equipment during construction and/or O&M of the remedy
- Design of cover systems, to the extent possible, to be usable for alternate uses, require minimal maintenance (*e.g.,* less mowing), and/or be integrated with the planned use of the property
- Beneficial reuse of material that would otherwise be considered a waste
- Use of Ultra Low Sulfur Diesel.

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[10] The annual O&M cost estimates associated with monitoring and maintenance of the East Barrier Wall and Outboard Area IRMs are included in the cost estimates for selected response actions identified in the 2011 and 2012 Response Action Documents, respectively. The annual O&M cost estimates associated with monitoring and maintenance of the other IRM elements cited here are included in the cost estimates.

[11] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

[12] See http://epa.gov/region2/superfund/green_remediation

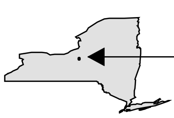
**BASIS FOR THE REMEDY PREFERENCE**

Alternatives 2 through 6 would be protective of human health and the environment and would address the RAOs; however, the implementability of soil mixing to include chemicals for stabilization included in Alternative 4 would need to be further evaluated for the Subsite. Also, Alternatives 5 and 6 are significantly more difficult to implement, present significant short-term impacts, and are the least cost-effective means of achieving the objectives. Alternative 3 is more protective than Alternative 2, equally protective and less costly than Alternative 4, and more practicable and implementable than Alternatives 5 and 6. As Alternative 3 includes the installation of a low permeability liner system beyond the wetland footprint within an area of DNAPL-impacted soil/fill material, it would significantly reduce the frequency of increased water conditions in the East and West Barrier Wall Collection Systems associated with lake flooding and significant precipitation events, and therefore provide greater long-term effectiveness and permanence than would Alternatives 2, 4, 5, and 6.

Based on information currently available, the NYSDEC and EPA believe that the preferred alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. NYSDEC and EPA expect the preferred alternative to satisfy the following statutory requirements of CERCLA §121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element (or justify not meeting the preference).

| Table 1 - Summary of Human Health Unacceptable Risks/Hazards | | | | | |
|---|---|---|---|---|---|
| **Exposure Area** | **Population** | **Exposure Media** | **Cancer Risk** | **Noncancer Hazard** | **COCs** |
| Exposure Unit 1 (Subsite-wide) | Older Child Trespasser | Fish tissue, surface sediment, surface soil, surface water | 1E-03 | 20 | 2,3,7,8-TCDD Equivalent, Mercury, Highly Chlorinated PCBs, Less Chlorinated PCBs, Benz(a)anthracene, Benzo(a)pyrene |
| | Adult Trespasser | Fish tissue, surface sediment, surface soil, surface water | 2E-03 | 20 | 2,3,7,8-TCDD Equivalent, Mercury, Highly Chlorinated PCBs, Less Chlorinated PCBs, Benzo(a)pyrene |
| | Utility Worker | Surface and subsurface sediment, surface water | 4E-04 | 4 | 2-Methylnaphthalene, Dibenzofuran, Benzo(a)pyrene |
| | Construction Worker | Surface and subsurface sediment, surface and subsurface soil, outdoor air | 2E-04 | 20 | 2,3,7,8-TCDD Equivalent, 2-Methylnaphthalene, Dibenzofuran, Manganese |
| Exposure Unit 5 (Penn-Can Property) | Commercial/Industrial Worker | Surface soil, indoor air | 3E-04 | | Benzo(a)pyrene |
| Exposure Unit 7 (Penn-Can Property, Lakeshore Area, DSA #1, DSA #2, AOS #1, AOS #2) | Commercial/Industrial Worker | Surface soil, potable water, indoor air | 4E-03 | 50 | Benz(a)anthracene, Benzo(a)pyrene, Benzene, Thallium, 2,4-Dimethylphenol, 3-Methylnaphthalene, 3&4-Methylphenol, 4-Methylphenol, Dibenzofuran, Naphthalene |
| Exposure Unit 6 (Harbor Brook, Lakeshore Area, East Flume, DSA #1, DSA #2, AOS #1) | Recreational Visitor – Child | Fish tissue, surface sediment, surface soil, surface water, indoor air | 9E-03 | 40 | Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(ah)anthracene, Indeno(1,2,3-cd)pyrene, 2,3,7,8-TCDD Equivalent, Mercury, Highly Chlorinated PCBs, Less Chlorinated PCBs |
| | Recreational Visitor-Adult | Fish tissue, surface sediment, surface soil, | 2E-03 | 20 | Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(ah)anthracene, |

| | | | | | |
|---|---|---|---|---|---|
| | | surface water, indoor air | | | Indeno(1,2,3-cd)pyrene, 2,3,7,8-TCDD Equivalent, Mercury, Highly Chlorinated PCBs, Less Chlorinated PCBs |
| Exposure Unit 8 (Subsite-Wide Groundwater) | Future Resident Child | Groundwater, indoor air | 7E-01 | 200 | Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Dibenz(ah)anthracene, Indeno(1,2,3-cd)pyrene, Benzene, Aluminum, Arsenic, Chromium, Iron, Thallium, 4,4’-DDT, 2,4-Dimethylphenol, 2-Methylnaphthalene, 3&4-Methylphenol, 4-Methylphenol, Dibenzofuran, Fluoranthene, Naphthalene, Phenanthrene |
| | Future Resident Adult | Groundwater, indoor air | 6E-02 | 90 | Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(ah)anthracene, Indeno(1,2,3-cd)pyrene, Benzene, Arsenic, Iron, Thallium, 2,4-Dimethylphenol, 2-Methylnaphthalene, 3&4-Methylphenol, 4-Methylphenol, Dibenzofuran, Fluoranthene, Naphthalene, Phenanthrene |

MAP LOCATION

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

**SITE LOCATION**

N

0 1,000 2,000 4,000
Feet

1:24,000

JUNE 2018
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O'BRIEN & GERE ENGINEERS, INC.

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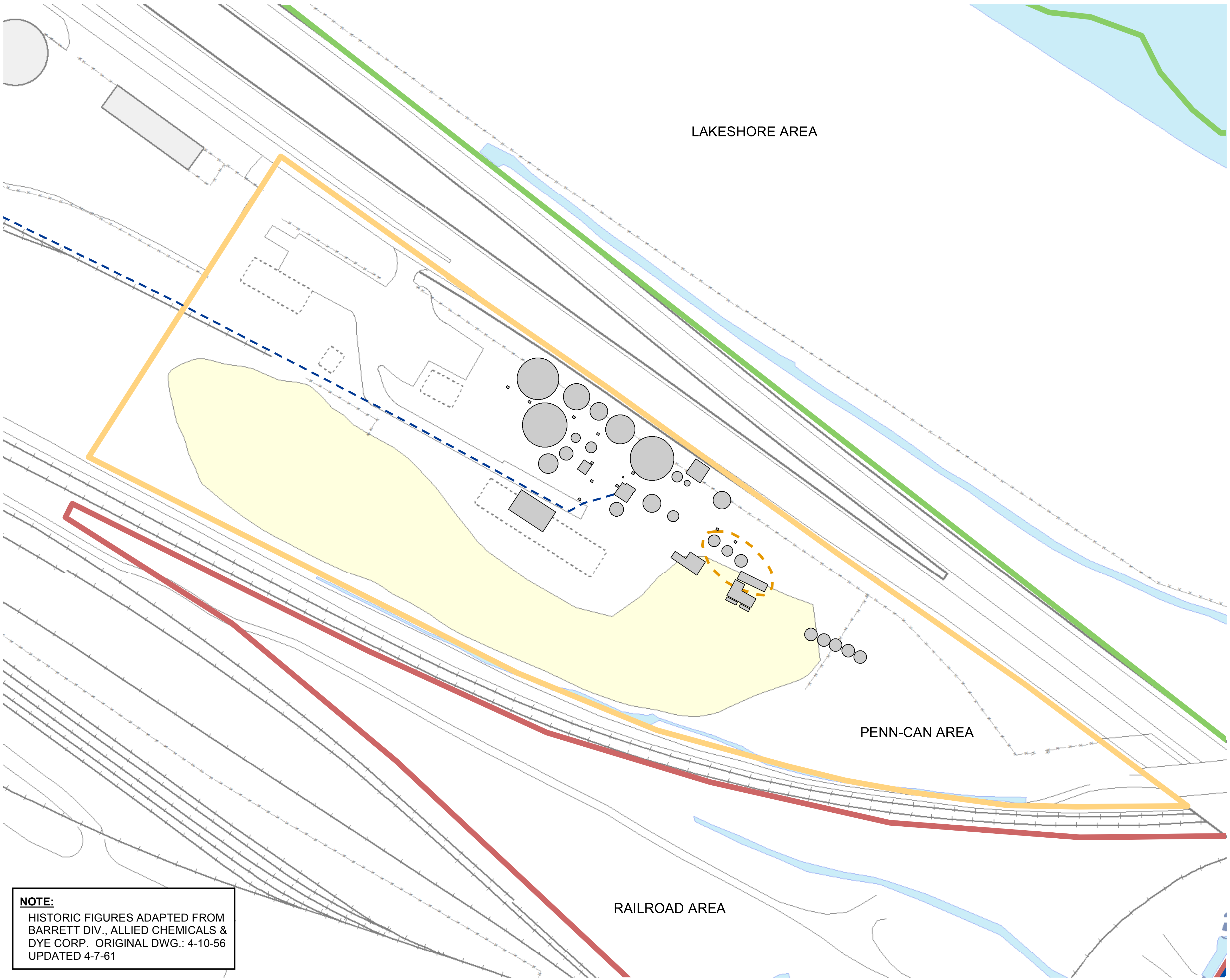
FIGURE 2




## LEGEND

- HISTORIC BARRETT PAVING PIPE (APPROXIMATE)
- EXISTING FENCELINE
- RAILROAD
- APPROXIMATE LOCATION OF FORMER BARRETT PAVING PIT
- HISTORIC BARRETT PAVING BUILDING LOCATION
- HISTORIC BARRETT PAVING TANK
- FORMER BUILDING (CONCRETE PAD REMAINS)
- HISTORIC BUILDING
- PENN-CAN PROPERTY FILL

### SITE BOUNDARIES

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

## HISTORIC PENN-CAN PROPERTY FEATURES

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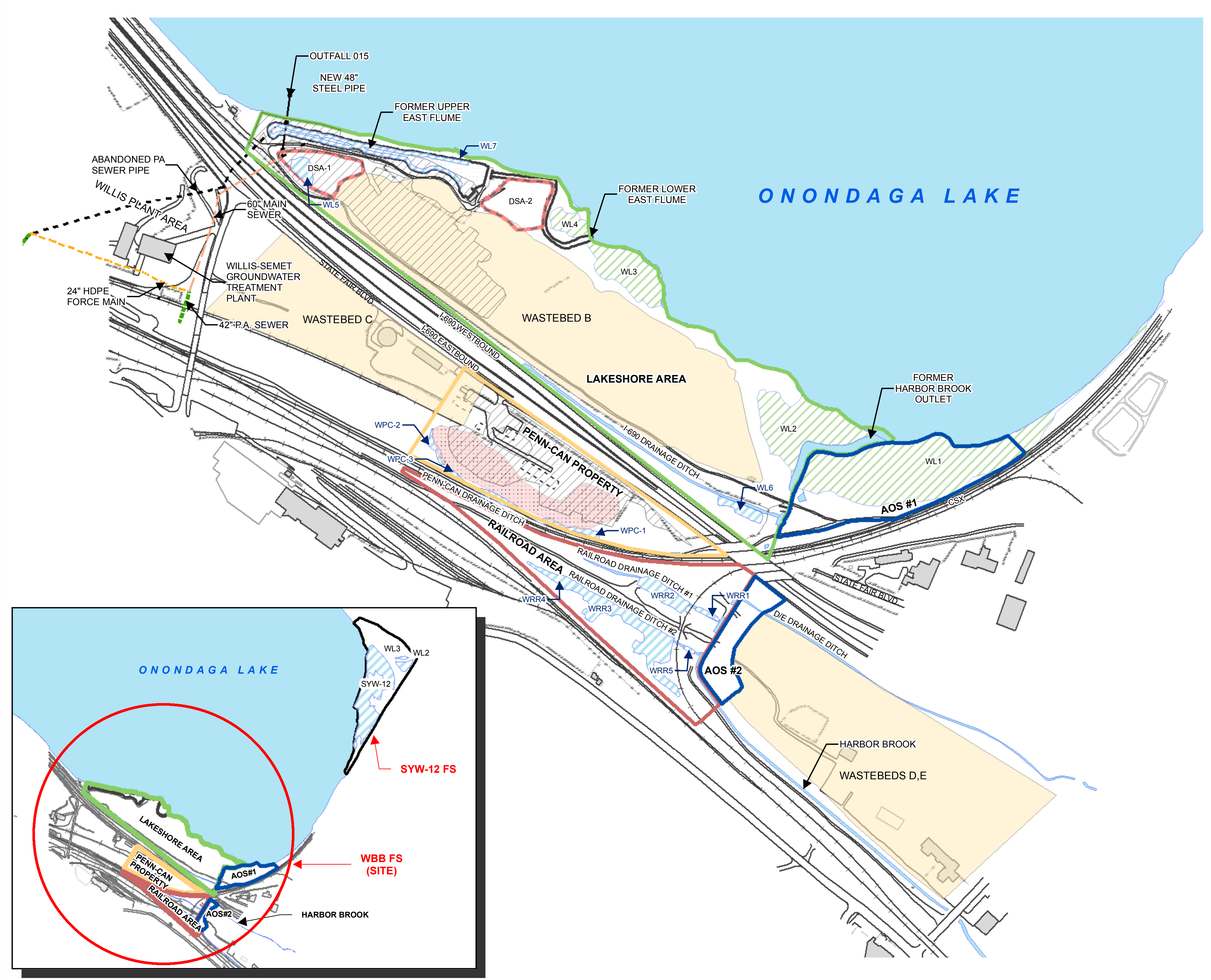
FIGURE 3

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## LEGEND

- LAKE REMEDY SUPPORT / STAGING AREA
- PENN-CAN PROPERTY FILL
- DELINEATED WETLAND
- BUILDING
- FORMER BUILDING (CONCRETE PAD REMAINS)
- HISTORIC BUILDING
- WASTEBED
- DREDGE SPOIL AREA BOUNDARY
- WETLANDS

### SITE BOUNDARIES

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY
- SYW-12

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

## SITE PLAN

0 250 500 1,000
Feet

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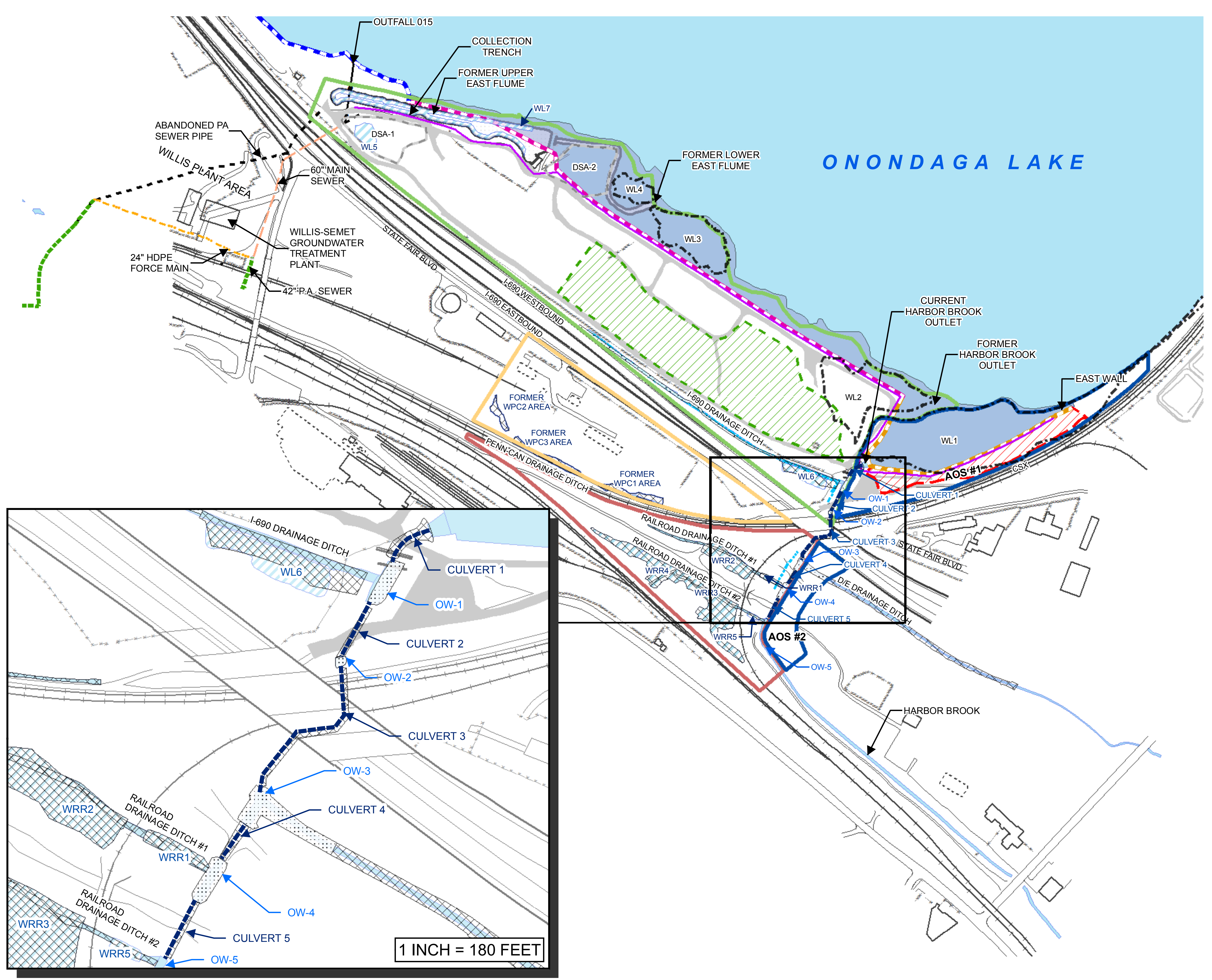
# FIGURE 4

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N

## LEGEND

### IRM FEATURES

- COVER AREA
- STAGED MATERIAL
- SEDIMENT REMOVAL
- SEDIMENT REMOVAL WITH LINER
- OUTBOARD WETLAND TRANSITIONAL ZONE
- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- COLLECTION TRENCH
- UPPER HARBOR BROOK COLLECTION TRENCH
- CULVERT

### SITE FEATURES

- ACCESS PATHWAYS
- DELINEATED WETLAND
- BUILDING

### HISTORIC FEATURES

- HISTORIC/FORMER BUILDING
- DREDGE SPOIL AREA BOUNDARY
- FORMER WETLANDS

### SITE BOUNDARIES

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

## IRMs AND SITE CHANGES

0 250 500 1,000
Feet

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O'BRIEN & GERE ENGINEERS, INC.


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## LEGEND

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IRM AREA
- CONCEPTUAL ONONDAGA COUNTY WEST SHORE TRAIL (PROPOSED BY OTHERS)
- AREA ADDRESSED BY LAKE REMEDY
- IN-LAKE WASTE DEPOSIT
- WASTE MANAGEMENT AREA

SITE BOUNDARIES

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY
- GENERAL GROUNDWATER FLOW DIRECTION

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
GEDDES AND SYRACUSE, NY

# WASTE MANAGEMENT AREA AND GROUNDWATER POINT OF COMPLIANCE

0 225 450 900
Feet

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FIGURE 6


N

**LEGEND**

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- WASTE MANAGEMENT AREA
- IRM AREA
- CONCEPTUAL ONONDAGA COUNTY WEST SHORE TRAIL (PROPOSED BY OTHERS)
- AREA ADDRESSED BY LAKE REMEDY
- 1-FT ENGINEERED COVER
- AREA ADDRESSED BY EXISTING FILL
- VEGETATION ENHANCEMENTS

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 2 - COVER SYSTEM WITH SHALLOW/ INTERMEDIATE GROUNDWATER RESTORATION VIA MNA AT POC**

0 225 450 900
Feet

JUNE 2018
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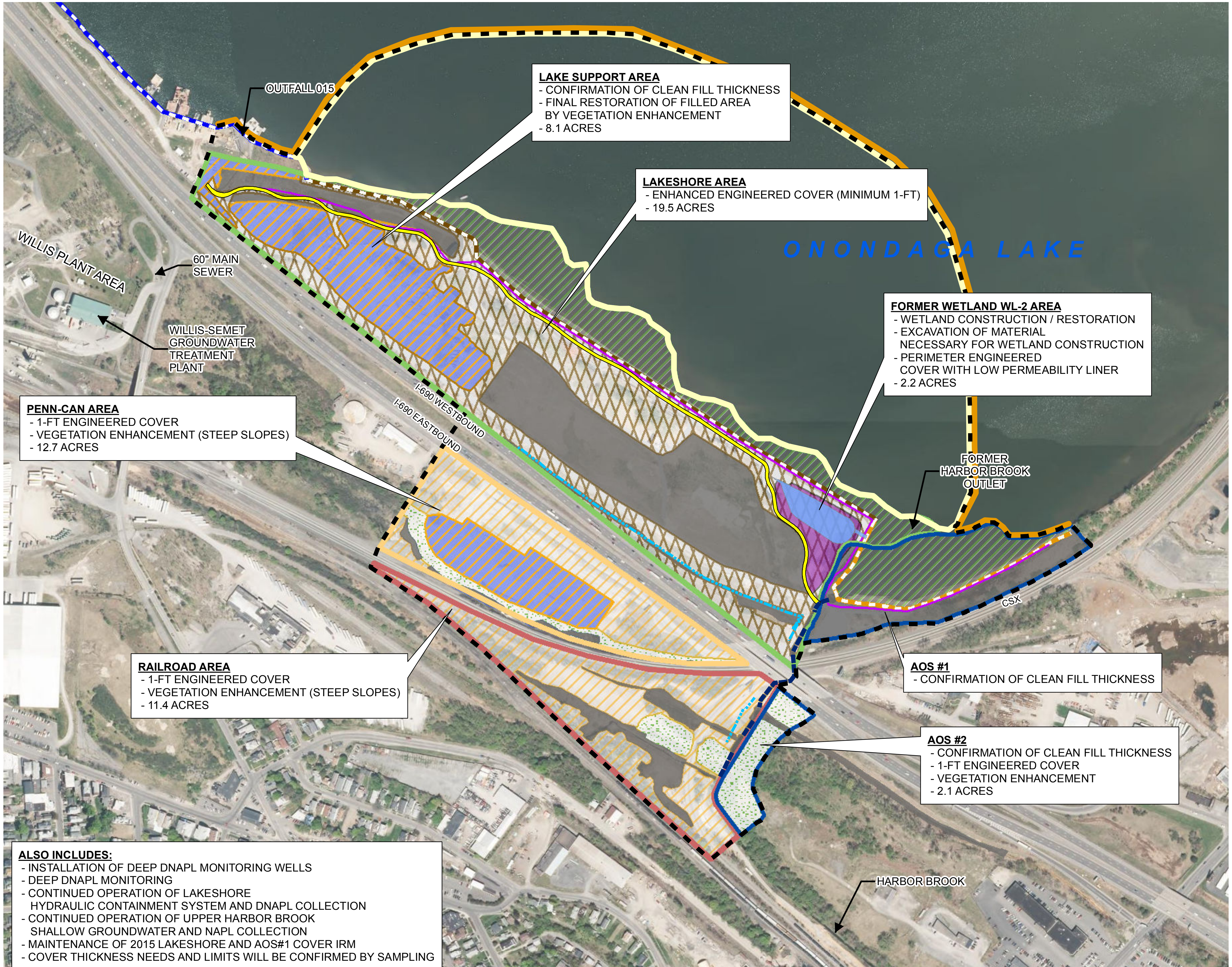
O'BRIEN & GERE ENGINEERS, INC.

FIGURE 7

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**LEGEND**

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- WASTE MANAGEMENT AREA
- IRM AREA
- CONCEPTUAL ONONDAGA COUNTY WEST SHORE TRAIL (PROPOSED BY OTHERS)
- ENHANCED ENGINEERED COVER
- 1-FT ENGINEERED COVER
- AREA ADDRESSED BY EXISTING FILL
- VEGETATION ENHANCEMENTS
- AREA ADDRESSED BY LAKE REMEDY / IRM
- LOW PERMEABILITY LINER BELOW COVER
- WETLAND CONSTRUCTION / RESTORATION

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 3 - ENHANCED COVER SYSTEM WITH WETLAND CONSTRUCTION / RESTORATION AND SHALLOW / INTERMEDIATE GROUNDWATER RESTORATION VIA MNA AT POC**

0 225 450 900
Feet

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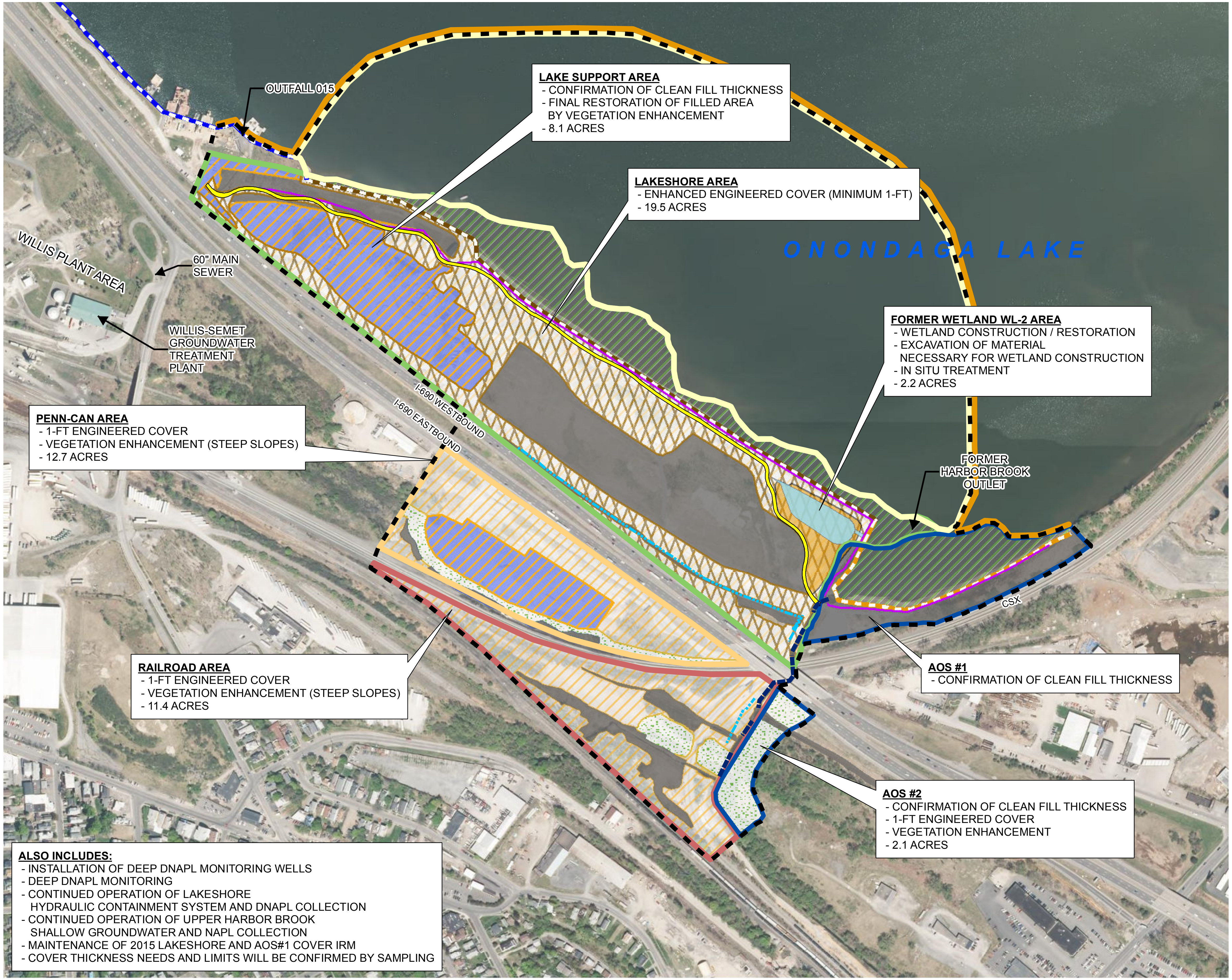
FIGURE 8




N

**LEGEND**

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- WASTE MANAGEMENT AREA
- IRM AREA
- CONCEPTUAL ONONDAGA COUNTY WEST SHORE TRAIL (PROPOSED BY OTHERS)
- ENHANCED ENGINEERED COVER
- 1-FT ENGINEERED COVER
- AREA ADDRESSED BY EXISTING FILL
- VEGETATION ENHANCEMENTS
- IN SITU TREATMENT
- AREA ADDRESSED BY LAKE REMEDY / IRM
- WETLAND CONSTRUCTION / RESTORATION

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 4 - ENHANCED COVER SYSTEM WITH WETLAND CONSTRUCTION / RESTORATION, IN SITU TREATMENT AND SHALLOW / INTERMEDIATE GROUNDWATER RESTORATION VIA MNA AT POC**

0 225 450 900
Feet

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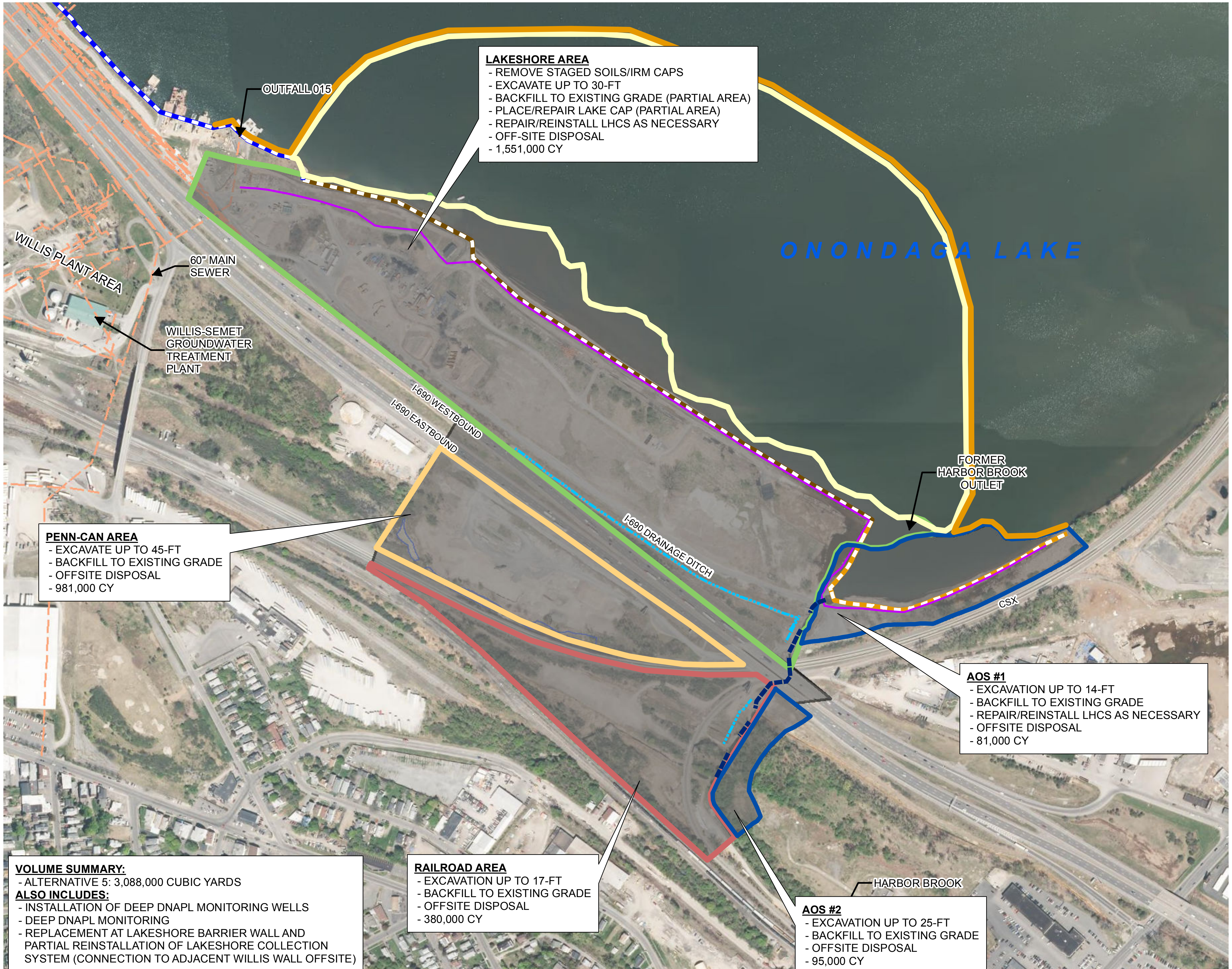
FIGURE 9




N

**LEGEND**

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- EXCAVATION

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 5 - PARTIAL EXCAVATION WITH OFF-SITE DISPOSAL AND SHALLOW / INTERMEDIATE GROUNDWATER RESTORATION VIA MNA AT POC**

0 225 450 900
Feet

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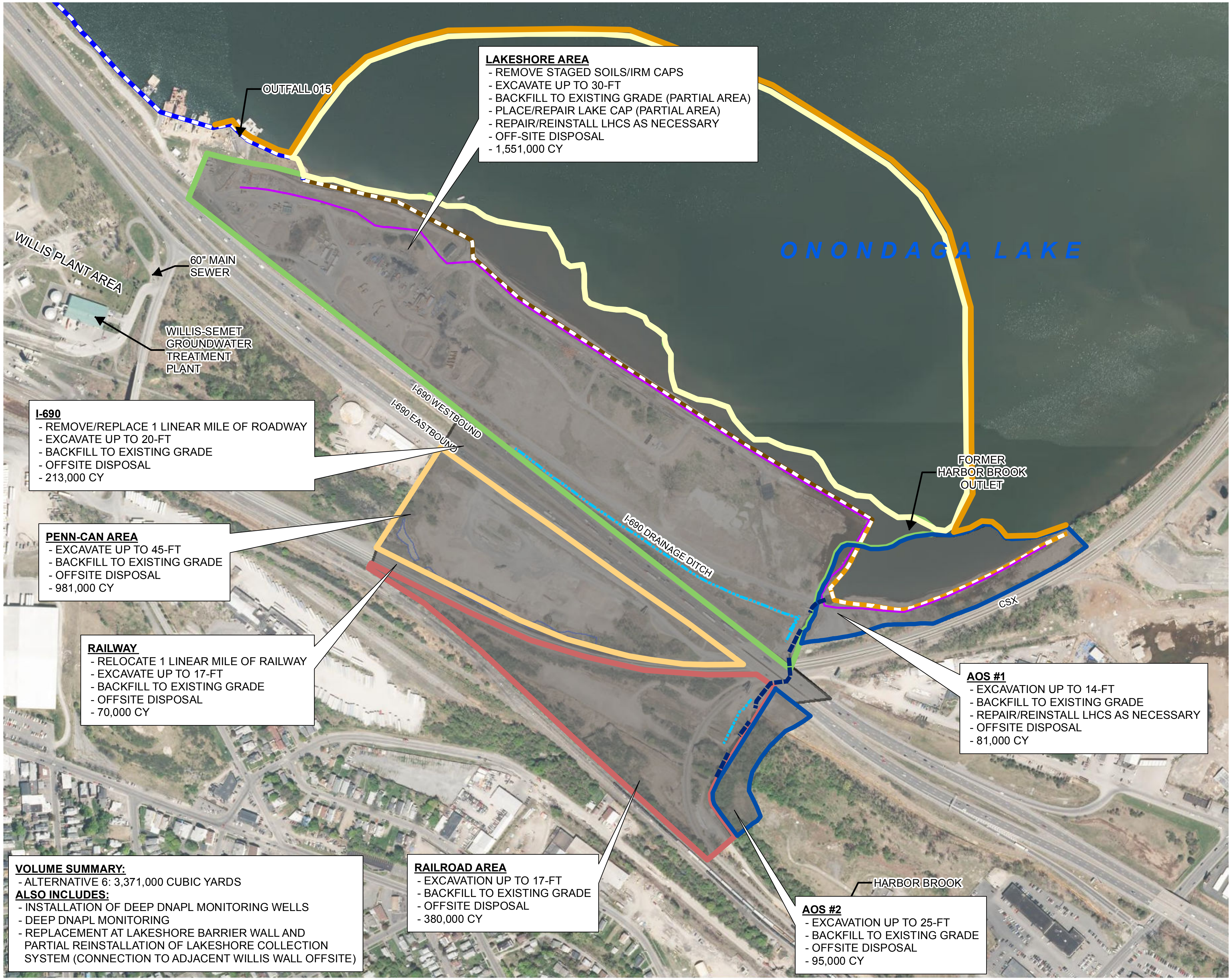
FIGURE 10




N

**LEGEND**

- EAST WALL
- WEST WALL
- WILLIS BARRIER WALL
- CULVERT
- UPPER HARBOR BROOK COLLECTION TRENCH
- COLLECTION TRENCH
- POINT OF COMPLIANCE (IN-LAKE POINT OF COMPLIANCE WOULD BE EXISTING LAKE BOTTOM)
- IN-LAKE WASTE DEPOSIT
- EXCAVATION

**SITE BOUNDARIES**

- RAILROAD AREA BOUNDARY
- LAKESHORE AREA BOUNDARY
- PENN-CAN PROPERTY BOUNDARY
- ADDITIONAL AREA OF STUDY BOUNDARY

HONEYWELL INTERNATIONAL INC.
WASTEBED B / HARBOR BROOK
PROPOSED REMEDIAL ACTION PLAN
GEDDES AND SYRACUSE, NY

**ALTERNATIVE 6 - FULL EXCAVATION WITH OFF-SITE DISPOSAL AND SHALLOW / INTERMEDIATE GROUNDWATER RESTORATION VIA MNA**

0 225 450 900
Feet

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**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-b**

**PUBLIC NOTICES PUBLISHED IN THE**
***SYRACUSE POST STANDARD***
**ON JULY 26, 2018 AND AUGUST 23, 2018**

0008716465-01

**Ad Content Proof**

**THE** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION INVITES PUBLIC COMMENT ON THE PROPOSED PLAN FOR THE WASTEBED B/HARBOR BROOK SITE The New York State Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (EPA) will hold an open house from 5:00 – 6:00 PM and a public meeting at 6:00 PM on August 16, 2018 at the Geddes Town Hall Courtroom 1000 Woods Road, Solvay, NY to discuss the Proposed Plan for the Wastebed B/Harbor Brook (WBB/HB) Subsite (Subsite) of the Onondaga Lake Superfund Site. The Proposed Plan provides a summary of the findings of the Remedial Investigation and Feasibility Study (RI/FS) conducted to determine the nature and extent of the contamination at the Subsite, whether this contamination poses a threat to public health and the environment, and identify and evaluate remedial alternatives. The Proposed Plan also identifies the preferred remedy and the basis for this preference. The NYSDEC and EPA are issuing the Proposed Plan to encourage and receive input and comments from the public. The primary objectives of this action are to minimize the migration of contaminants and minimize any current and potential future human health and environmental impacts. The main features of the preferred remedy include the placement of cover systems that would be protective for current and/or reasonably anticipated future land uses (e.g., active and passive recreational uses). The types of cover that would be applied at the Subsite include one- to two-foot thick cover systems, and a vegetation enhancement cover. The type of cover system applied to a given area of the site would be based on the contaminant levels, the current and/or reasonably anticipated future land uses (e.g., active and passive recreational uses), the extent of existing cover materials in that area, and pertinent requirements. Native species would be used for the vegetative component of covers. A Preliminary Design Investigation and dense non-aqueous phase liquid evaluation and recovery would be performed on a portion of the Subsite, along with the installation of a 1-foot thick soil/granular or asphalt cover and other actions (e.g., removal, stabilization), if necessary, to provide long-term isolation of underlying impacted soils. A Site Management Plan, implementation of institutional controls, and long-term maintenance and monitoring are also components of the proposed remedy. The Proposed Plan also addresses the contaminated shallow and intermediate groundwater. The deep groundwater will be addressed as part of a regional unit in a future study. SYW-12 (also known as Murphy's Island), is also part of the Subsite and will be addressed in a separate evaluation. The remedy described in the Proposed Plan is the NYSDEC and EPA's preferred remedy for the Subsite. Changes to

Subsite. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after the NYSDEC and EPA have taken into consideration all public comments. The NYSDEC is soliciting public comment on the alternatives considered in the detailed analysis of the FS because NYSDEC and EPA may select a remedy other than the preferred remedy. The Proposed Plan, RI report, and FS report are available at the following locations. Information is also available on DEC's website at www.dec.ny.gov/chemical/37558.html. Onondaga County Public Library 447 South Salina Street Syracuse, New York 13202 315 435 1800 Solvay Public Library 615 Woods Road Solvay, NY 13209 Phone: (315) 468-2441; Atlantic States Legal Foundation 658 West Onondaga Street Syracuse, New York 13204 315 475 1170; NYSDEC 615 Erie Boulevard, West Syracuse, New York 13204 2400 315 426 7400 Please call for an appointment; NYSDEC, DER 625 Broadway, 12th Floor Albany, New York 12233 7013 518 402 9676 Please call for an appointment. Written comments associated with the remedy for the Subsite, received during the public comment period which ends on August 24, 2018, as well as oral comments received at the public meeting, will be documented and addressed in the Respon-

dressed in the Respon-
siveness Summary section of the Record of Decision, the document which formalizes the selection of the remedy. All written comments should be addressed to: Mr. Tracy A. Smith, Project Manager NYS Department of Environmental Conservation 625 Broadway, 12th Floor Albany, NY 12233 7013 tracy.smith@dec.ny.gov (Indicate "WBB/HB Proposed Plan Comments" in the subject line of the e-mail)

0008757442-01

**Ad Content Proof**

**THE** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION EXTENDS THE PUBLIC COMMENT PERIOD 30 DAYS TO SEPTEMBER 24, 2018 ON THE PROPOSED PLAN FOR THE WASTEBED B/HARBOR BROOK SITE. The New York State Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (EPA) issued a Proposed Plan for the site on July 25, 2018. A public notice which discussed the issuance of the Proposed Plan was published in the Syracuse Post Standard on July 26, 2018. Based on a request from the public, the comment period is being extended 30 days to September 24, 2018. The Proposed Plan, Remedial Investigation, and Feasibility Study are available at the following locations. Information is also available on DEC's website at www.dec.ny.gov/chemical/37558.html. Onondaga County Public Library 447 South Salina Street Syracuse, New York 13202 315 435 1800; Solvay Public Library 615 Woods Road Solvay, NY 13209 Phone: (315) 468-2441; Atlantic States Legal Foundation 658 West Onondaga Street Syracuse, New York 13204 315 475 1170; NYSDEC 615 Erie Boulevard, West Syracuse, New York 13204 2400 315 426 7400 Please call for an appointment; NYSDEC, DER 625 Broadway, 12th Floor Albany, New York 12233 7013 518 402 9676 Please call for an appointment. Comments received during the comment period, as well as oral comments received at the August 16, 2018 public meeting, will be documented and addressed in the Responsiveness Summary section of the Record of Decision, the document which formalizes the selection of the remedy. All written comments should be addressed to: Mr. Tracy A. Smith, Project Manager NYS Department of Environmental Conservation 625 Broadway, 12th Floor Albany, NY 12233 7013 tracy.smith@dec.ny.gov (Indicate "WBB/HB Proposed Plan Comments" in the subject line of the e-mail)

**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-c**

**PUBLIC MEETING SIGN-IN SHEET**

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

**Public Meeting**

Topic Wastebed B/Harbor Brook Site # 734075

Date August 16, 2018

PRINT NAME

| Name | Affiliation, if any | Contact Information |
|---|---|---|
| 1. Peggy Chase | Onondaga County Legislator | PeggyChase2013@TWCNY.RR.com |
| 2. Hugh Kimball | CPWG | contlr14@aol.com |
| 3. Jessica Bumpus | | jessica.bumpus13@gmail.com |
| 4. Jason Newton | | JasNewt@aol.com |
| 5. Frank Moses | CPWG | Mosescpwg@gmail.com |
| 6. Maude Morse | Village Solvay Resident | mlmorse@verizon.net |
| 7. Lindsay Speer | Creating Change Consulting | lindsayspeer@gmail.com |
| 8. Richelle Brown | | richellecbrown@gmail.com |
| 9. Anne Augustine | | aaugustine@Dscny.org |
| 10. Holly Granat | Onondaga County | |
| 11. Maureen Curtin | CNY Solidarity | maureen.curtin@oswego.edu |
| 12. Melinda Reynolds | — | melly642@gmail.com |
| 13. | | |
| 14. | | |
| 15. | | |

**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-d**

**AUGUST 16, 2018 PUBLIC MEETING TRANSCRIPT**

STATE OF NEW YORK :

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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In the Matter of the

REMEDY PROPOSED for STATE SUPERFUND SITE
WASTE BED B, HARBOR BROOK PROPOSED PLAN

------------------------------------------

PUBLIC MEETING and Public Comment Period, conducted at the Geddes Town Hall, 1000 Woods Road, Solvay, New York before JOHN F. DRURY, CSR, Notary Public in and for the State of New York, on August 16, 2018, 6:00 to 7:10 p.m.

A p p e a r a n c e s:

TRACY ALAN SMITH, Presenter,
Project Manager NYSDEC

DON HESLER, NYSDEC

BOB NUNES, EPA

Stephanie Webb, NYSDEC

Mark Sergott, P.G., NYSDOH

Erin Rankin, PE, O'Brien & Gere
Senior Project Manager, Environment
Erin.Rankin@obg.com

Clare Leary, O'Brien & Gere

## INDEX TO SPEAKERS



## QUESTION AND ANSWER SESSION

Tracy Smith

MR. TRACY SMITH: Might as well get started, I guess. Let me know if you can't hear me clearly or want me to get louder. My name is Tracy Smith, I'm the project manager for the Waste Bed B/ Harbor Brook site we're going to be discussing tonight.

I'll give you some background. The presentation will be background, discuss the alternatives that were evaluated, discuss the preferred remedies, and then I'll discuss the next steps for the path forward.

So for some site background. This site, sub site of the Onondaga Lake Site, the MBL site. It's located north and south of 690, over here. Portions of the site were shortly used for the deposition of Solvay waste, mainly Waste Bed B, located right here. Solvay waste is an urban materials, it is largely a calcium carbonate, calcium silicate, materials like that. We use the term soil fill materials for the site

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throughout the document in the proposed plan. That refers to Solvay waste and the overlying fill materials on the site. We're going to use that term quite a bit.

The overlying fill materials, just a gravel in place there, lots of materials have been placed there. The alternative and remedy I'll be discussing today include the soil fill materials. It also includes the shallow and intermediate groundwater on the site. Deep groundwater exists on the adjacent sites, such as the Willis Avenue site, located here, the Semet Residue Ponds locked here and the Waste Bed 1 through 8 site, located over here will be addressed separately. And that's going to be part of a regional unit, that deep groundwater.

In addition, there is SYW 12 located out here, also known as Murphy's Island. That was investigated as part of the site. Remediation for that will also be

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performed separately.

For some more site background. The solid waste that was disposed in much of the area in the 1900s, early 1900s, there was also asphalt production and storage that occurred on the Penn-Can property. Several investigations were performed on the site. The main one, which was the remedial investigation, which was performed in the early 2000s.

Risk assessments were also performed. These include human health risk assessment or an HHRA. And an ecological risk assessment. They're best based on no remedial activities performed at that time. Those risk assessments, the HHRA found unacceptable risk to trespassers, recreators, construction workers and future residents, which is not anticipated for this site. Don't anticipate it to be a residential area.

Ecological risk assessment found an unacceptable risk to plant and animals,

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such as birds, foxes, blue herons, stuff like that. Many of these risks were addressed as part of an interim remedial measure, which has been performed at the site. I'll be discussing those later.

For some background, here's a 1951 aerial photo of the site. This shows the former tanks that were present at the Penn-Can area, where the paving, the asphalt production facility was. Waste Bed B is located here. And this area, the large whiteout, white area in the lake is the in lake waste deposit, which was addressed during the lake dredging.

Several contaminants are present on the site. We have the ones listed here, benzene, toluene, ethyl benzene, etc., PCB, metals include mercury. In addition there is dense non-aqueous phase liquid or DNAPL. Basically an oil like material which is present on the site, located on the subsurface. There is some pictures of it. Pictures include some of the DNAPL that we've

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seen at the site. There's also stain materials.

We do have some tar present in areas of the Penn-Can property. That's been observed at the surface, which needs to be addressed. So some of these figures, these pictures here, you can see the DNAPL present in some of the cores which were present. And those were collected within Harbor Brook at the time back in some of the investigations.

This is, this figure shows the, where a lot of the DNAPL was located. We have that poster out front also. Mainly on the eastern area of the site, throughout this area. Some of the interim remedial measures that were performed addressed the migration of that DNAPL, with the barrier walls that were installed, which I'll discuss also.

The interim remedial actions or IRMs. So we've got several of them. These were performed to shut off sources of contamination from migrating from the

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site to Onondaga Lake and Harbor Brook. So we've got the east and west barrier walls, these flume IRMs, off the Harbor Brook. The figures shows where they're located for the most part.

A quick run down of them. East and west barrier wall, located in the red line here, going along the lakeshore essentially. So a steel sheet pile barrier wall and a groundwater collection system were installed in this area. That collection system connects to the Willis Semet barrier wall. On this site extends about 5,000 feet, I believe. So we've got groundwater collection behind that barrier wall, so there is no groundwater migrating to Onondaga Lake in that area.

During the installation of the east wall, Harbor Brook was also relocated. Since DNAPL is located within and below Harbor Brook, we wanted to make sure that was encapsulated behind the wall. So the wall was located within the area

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of the DNAPL. And Harbor Brook was relocated to basically the east, outside barrier wall.

We also have the upper Harbor Brook IRM. That's basically from Harbor Brook upstream here to maybe 3,000 feet or so. I don't know if that's that long, but. Sediment removal was performed in the Brook, and in associated drainage ditches on the site, here, here. And probably four or five drainage ditches. And their associated wetlands with those. So sediment was removed from all those areas. And clean backfill was placed in those. Wetlands were restored. The ditches were restored.

A liner was installed beneath Harbor Brook to prevent contaminated groundwater to continue to migrate into Harbor Brook. And also one other drainage ditch, where there was significant contamination present underneath it. There was also a groundwater collection system installed

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along Harbor Brook in this area here and this area here.

The other major IRM was the outboard area, which everything outside of the barrier wall here in the light blue was dredged. Basically in conjunction with the Onondaga Lake Dredging Project. So about six feet, maybe more in some areas, nine feet of material removed. And that material was essentially shipped up to the FDA as part of the assessment consolidation area during the Onondaga Lake Remedy. That work was completed in 2017. Several other IRMs were completed previous to that.

Some contaminated material removed from the IRMs were placed up on the site. Basically up in this central area of Waste Bed B and stockpiled there. There was placed, like a two foot cover was placed over them to make sure they would not have any contamination issues of runoff. And store them there temporarily until we find a remedy in

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terms which we'll discuss today, the remedy.

We also had a couple of clean fill areas that were used on the site. One area was located essentially here, and the other area here. Those were on the Penn-Can property. Clean fill was placed, including gravel, soil to provide an area for base of operations for the Onondaga Lake dredging and other site work.

Here's the pictures of the west wall installation back in August of 2010. Basically it's steel sheet piles being installed and driven with a large sheet pile driving machine. Excavating and installed a collection trench behind the wall. Solid waste in that area.

This picture shows an aerial photo from 2003. So you'll see the area was basically a lot of trees overgrown, there is Harbor Brook in this alignment here, with a lot of phragmites in the wetland down near the lake.

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This photo is from 2013, you can see this was during the -- following the Onondaga Lake dredging and before capping was completed. So you can see basically the wall alignment before the capping was placed. So a lot of changes on the site. You can see material being stockpiled, the other staging areas, stuff like that.

This photo is from last year, from 2017. So this you can see the restored outboard area. Restoration is being performed, was performed there, and plantings, restoring the wetlands on the outboard area, you can see the Harbor Brook channel here. The restoration this year looked even better than last year, so there is a lot more vegetation present on the site.

These rock, I guess jetties that you call them, are present there to help protect the wetland along the lakeshore from wind and wave action and ice action. Those were installed as part of

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the Onondaga Lake Remedy.

So these are a list of the remedial action objectives for the site. Those are the objectives that have been established. I'm not going to read these all, of course. These bullets are just a summary of the site. Remedial activity objectives.

The main purpose is to prevent unacceptable human exposure and ecological impact, and prevent migration of contaminants from Onondaga Lake or to Onondaga Lake and Harbor Brook. At a minimum, the remedy needs to eliminate or mitigate all stress to public health and the environment presented by the contamination.

Getting into the alternatives for the site that we've evaluated as part of the feasibility process, feasibility study process and evaluated in these proposed plans. These are alternatives that were considered based on the remedial action objectives and review of

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applicable technologies to address the contamination of the site.

We have Alternative 1, which is a no action alternative. We're required to evaluate this alternative in all of our remedies. It's more of the baseline or for comparison to the other alternatives. This alternative basically leaves the site in the present condition. It doesn't provide any additional protection to the public or the environment.

Alternatives 2, 3 and 4 are cover alternatives, and they include different components. These alternatives include cover systems to prevent exposure to the contaminated materials and groundwater restoration outside the barrier walls, the monitored natural attenuation, MNA.

These alternatives also include operating and maintaining the IRM, as I mentioned previously, the barrier walls, collection systems, stuff like that, and covers that have been placed.

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The cover systems for these Alternatives 2, 3 and 4, would be based on the soil cleanup objective or SCO which the DEC has. Alternative 2 includes one foot of soil cover. Alternatives 3 and 4 includes either one or two feet of cover, depending on current or the future use of the site.

Primary uses for the site are anticipated to be commercial or passive recreational use, such as parking areas, or walking trails, similar to what's been constructed up at Waste Bed 1, which is a trail up there. That would require minimum 1 foot cover, in areas where there are parking areas, walking trails, but that use can change in the future prior to design, then those covers could be changed and additional material could be placed. And the site used to become something more active recreational, such as a soccer field or something like that and more material could be added.

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The Alternatives 2, 3 and 4, include performance of a preliminary design investigation. That would include a DNAPL evaluation on the Penn-Can property to determine if recovery of DNAPL was feasible. Mainly to see if DNAPL could be pumped off, recovered and disposed of. So we could remove some of the source material on site.

There would also be action to address the tar materials that have been observed on the Penn-Can property. So it's going to include removal of that tar material or stabilization to prevent it from migrating in the future. And also place any cover over that area.

Alternatives 3 and 4 also include construction of a wetland in a low lying area located at the corner of the barrier walls. I'll show you a figure of that later. But that's an area where DNAPL and staining soil was present. It was also previously a wetland prior to the barrier wall construction. It's

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also prone to flooding, so it would be a benefit to any of the groundwater collection systems that are there. So that would prevent lake water from getting -- when it went over the top of the wall, it wouldn't get into the collection system. When it had to be collected it would be considered clean water. So it would help out the groundwater collection systems that are present there.

Under Alternative 3, a liner system is proposed. And that would be installed to segregate the underlying contaminated soils from the wetland that would be constructed above the liner.

Alternative 4 includes a geo chemical stabilization. And that would partially destroy the contaminants that are present there, and reduce the admissibility of the remaining contamination, basically solidify it in place, so it wouldn't migrate.

Alternatives 5 and 6 are removal

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alternatives. Alternative 6 is a forward removal alternative, something we evaluate, restoring the area to basically an uncontaminated state. So that includes full removal of the contaminated materials. Unfortunately also includes removing and replacing infrastructure, such as the highway, railroad tracks, utilities in the area.

We also evaluated Alternative 5, which is a partial excavation alternative. That would remove a significant portion of Waste Bed B. But we keep the infrastructure in place, such as the highway, and that would be excavated and removed as part of that alternative.

Show this right here, because many of the alternatives we discussed include restoration of the shell and intermediate groundwater at a point of compliance, which is located, would be located outside of this orange line. So that point compliance would be -- the

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groundwater would be restored outside that point of compliance, be a monitored natural attenuation. So that point of compliance is outside the site, and the adjacent in lake waste deposit, similar to what I showed you on the previous area aerial photo. In lake deposits has, which is then impacted from groundwater from the site, has been capped as part of the Onondaga Lake Remediation.

There is an evaluation of the groundwater performed at the ports natural attenuation. There is degradation of groundwater, organic constituents occurring. Further evaluation of the MNA would be performed in the future to make sure that it is continuing as part of monitoring for the site.

So we evaluate the remedial alternatives using these criteria. All the remedial alternatives, other than the no action alternative, undergo this

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detailed evaluation and must meet the first two criteria, which are protection of the health and environment in compliance with federal and state regulations.

The other criteria includes long term effectiveness and permanence, short term effectiveness, how easy or difficult a remedy is to implement, and how the remedy is accepted by the community. There is also state acceptance, such as your Department of Health and the views of them.

Alternatives 5 and 6, those removal alternatives, they have several implement-ability issues. Those alternatives assume around 3.7 million cubic yards and 4.2 million cubic yards of material to be transported off site for disposal.

To give you an idea, that's approximately 145 truck loads of material per day over 10 months of the year for three or four years while the

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excavation off-site disposal is being performed. Then backfill material would also need to be brought back to the site. So that would result in increased truck traffic, worker public safety issues, stability issues with excavating that large amount of material, large volumes of construction water. And then the ability to find a place to dispose of all those, that volume of material.

Here's a list of costs of the alternatives, including estimated construction time frame.

Alternative 1 of course is zero.

Alternative 2 has a cost almost 17 million.

Alternative 3 is approximately 19 million. Many of you might have seen the fact sheet online, the article in the newspaper that was incorrect, with that noted 12.7 million. It should have been 19 million actually.

Alternative 4 has a cost of 27 million. And the partial and full

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removal Alternatives 5 and 6 have the highest cost over 1 billion dollars essentially. It would take a longer time, estimated at four to six years. I think that's a pretty conservative estimate. Some doubt it would be longer than that if they ever did construct it. All these costs include long term operation of management of the alternatives.

Moving on to the Preferred Alternative. Our Preferred Alternative is Alternative 3, the enhanced engineered cover system. The wetland construction restoration and shallow and intermediate groundwater restoration with the natural attenuation at the points of compliance.

This alternative includes 1 to 2 foot cover system or an asphalt cover over the site or on site areas. The preliminary design investigation on Penn-Can property to evaluate the potential for the DNAPL recovery, and

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the additional measures to address superficial tar.

Construction of the wetland on Waste Bed B will show a couple of details on here. So this is Penn-Can property, is located up here where the DNAPL evaluation and the tar, superficial tar evaluation will be performed. The wetland area is located down here at the corner, where it's this wall here. So approximately 1 acre wetland would be constructed with a liner underneath.

So that includes the low permeability liner system within and beyond the wetland footprint such as the purple area. And that would cover up DNAPL stained soils in that low lying area, from discharge to groundwater and surface water and segregate the contaminated soils from the wetland being constructed.

So the alternative also includes operation and maintenance of the existing IRMs, the ones I mentioned

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previously, the barrier walls, Harbor Brook IRM. Also got the groundwater restoration that I've mentioned also.

Alternative 3 was proposed as the Preferred Alternative because it protects human health and environment and provides the best balance for the alternatives, based on the criteria we evaluated. And it would achieve the remediation goals for the site.

That preferred remedy will also include institution of controls and site management plan. The institution of controls would further reduce the potential for exposure to the site, such as restricting the site's future use. Like if we wanted to consider, wouldn't allow residential use on the site for buildings for houses or something to be constructed there. Other uses could be such as part of the bike trail or a parking lot would be the anticipated use there.

We have a site management plan, that

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would include the maintenance and monitoring or the inspection of covers and address any future changes in use of the site. Like the example I used before, if there is any active use that would be constructed there, such as soccer fields, an additional cover could be placed. There is other uses such as if a picnic area is proposed, an additional cover may need to be placed there. Just to make sure we should cover the place when used. And the time to implement that alternative is approximately two to three years.

To summarize the remedy, the next step, as you see the close of public comment period is anticipated for August 24th. We're accepting comments by that date. There has been a request for an extension. It's been received, and that's under consideration. If an extension is granted, then there will be a notice sent out probably through the list you might have seen before or

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through the e-mail system or a notice in the paper. You can mail, e-mail or write comments. There are cards here, if they're available, or just ask us, they'll be documented today also. If you have any questions.

Following the public comment period the Record Of Decision, which will select the final remedy for the site will be drafted. And a remedial design will proceed with construction we anticipated to commence shortly after that. That pretty much wraps up everything.

Here's my information. That's in the fact sheets, available, you can e-mail or you can contact me with any questions. We're available now to answer any questions you may have, and those will be documented in the responsive summary of the Record Of Decision and answered in that document also.

LINDSAY SPEER: Why not Remedy 4?

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TRACY SMITH: Remedy 4, that would be, I think, more difficult to implement with the stabilization. There are other, would have to be some pre-design investigations to make sure that the geochemical stabilization will be compatible material. So that would essentially be a little more difficult to implement I think. There would have to be the investigation there.

The liner system has been shown to be effective at other sites, Waste Bed 1 through 8, we constructed wetland there. If you've ever been up there it's been pretty effective there. It isolates, the liner would isolate material from below. So some of the main reasons. Not to mention of course cost.
I think the biggest thing would be potential, implement-ability issue with the material.

PEGGY CHASE: What kind of a time frame and how would you intend to monitor this?

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TRACY SMITH: You mean time frame for monitoring --

PEGGY CHASE: Forever.

TRACY SMITH: Basically yes, the system would have to, the cover system would have to be monitored indefinitely. So you're talking in perpetuity, forever. The groundwater collection system will have to be operated indefinitely also. So yes, we're talking a cover system that would need to be maintained forever essentially.

PEGGY CHASE: And once we finish this, whose responsibility is it going to be to maintain it?

TRACY SMITH: Honeywell. Honeywell would construct the remedy. We've got -- we would have an order with them to construct the remedy. And then they would have to do the operation and maintenance as to what they've been doing on other sites nearby. Onondaga Lake, they've also been doing the maintenance of that and collected samples and monitoring of that also. So similar situation here.

MAUREEN CURTIN: Affordability seems to be a pretty significant factor in the analysis you just laid out. It certainly came up. So some kind of a low ball option it seems like. And comparatively, and I'm wondering, whose analysis is this? Is this Honeywell? Because it seems that's the kind of figure that is really a good number for them. But the DEC is supposed to represent the people, the state. So this seems like a pretty convenient arrangement for Honeywell. Doesn't really serve the people.

MR. TRACY SMITH: Well, Honeywell has drafted up the FS. We have reviewed that, evaluated that. The alternative we selected, it meets all of our goals and the alternative analysis that we performed. I don't know if you can lay anymore on that Don or Bob?

BOB NUNES (EPA): When you did the

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evaluation, the evaluation had been by DEC and EPA. We use the period that Tracy showed in the slide. And so we evaluate the material, evaluate the alternative results for the criteria and try to evaluate how one compares to the other.

Like for example, Tracy is pointing out, Alternative 3, we thought was preferable to Alternative 4. Because besides the fact it cost less it's more implementible. Because Alternative 4 would require pre-design work, studies to see if that stabilization would work, would it be feasible.

Also we think Alternative 3, which requires a cover system, would be more effective in terms of providing long term effectiveness and permanence. Because there is a section of the wall system that is collecting more water from the precipitation and from the lake during high water periods. And that barrier wall, that impermeable break

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will help to rectify that situation. So there are advantages with Alternative 3 relative to Alternative 4.

So we looked at those things when we're doing the evaluation. And so yes, Alternative 3 is less costly than the other alternatives, but in our view it's preferable based on the evaluation. That's in accordance with the national plans that required for this site.

LINDSAY SPEER: How are you checking the barrier wall to ensure that's actually still sound? Steel rusts, this is a barrier wall buried underground against a lake known to be salty. How long do you expect that barrier wall to hold back the flumes, the DNAPL polluted groundwater on this site?

TRACY SMITH: That barrier wall should operate indefinitely. There is many systems in place to make sure it doesn't corrode. There was a coating placed on it to prevent corrosion. There's also zinc, sacrificial zinc anodes they're called. So those zinc anodes help counterbalance any erosion. And those can be replaced when they're spent, basically. That are accessible along the wall I think every 15 feet or so. So these are periodically checked, I think. And those anodes are supposed to last a hundred years. Essentially a five foot piece of zinc connected to the wall. Those will shrink over time. And when they get to a place where they need to be replaced they will be replaced to help rust corrosion on the wall.

Corrosion on the wall also, when you're in a low oxygen environment you don't have rust as much also. So when you're below the groundwater table you don't have as much oxygen in the environment to rust materials. Is that all your question, did I miss something on there?

LINDSAY SPEER: Well, forgive me for not trusting that that will last forever. Forgive me for not trusting that Honeywell will last forever; and that DEC will be around to be held accountable forever. Governments change. With the way things are going, it's kind of worrying the longer we'll be here to hold people accountable.

I would strongly encourage the DEC to pursue the best remedy at this time while you can. Institutional controls, lining, you know we've seen what that was on Waste Beds 1 through 8 where fences are along the trail. But you can climb over and get around. People like wandering through natural areas. If it looks like a natural area, then they are going to go off trail, they want to go off trail.

And saying -- expecting that fences will keep people safe is not an adequate solution, not for pollution.

MR. TRACY SMITH: On this site we have covers placed over all materials, so wouldn't have fences necessarily, needed to prevent people from going into

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one area or the other, with the cover system that will be in place on this site. I know 1 through 8 is a different example. We've gone through that before. We've got areas that are inaccessible, either not exceeding -- or a separate site, we can talk more about it some time if you want.

LINDSAY SPEER: Just an example of how, I mean we're going to see a trail put across this site as well. And from what I understand that is the plan?

MR. TRACY SMITH: The plan, right.

LINDSAY SPEER: And we've seen, on 1 through 8 an example of how people do not obey those particular controls. We see it around the Amphitheater site where people jump fences to go off and be in the woods. And there needs to be more done, need to have more waste removed. I also have a question of you talk about in the future if there is another use.

MR. TRACY SMITH: Right.

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LINDSAY SPEER: That somebody would have to do. Who would pay for those additional costs?

MR. TRACY SMITH: I guess that would be Honeywell, depending on if there is another party that changes the use. But I think it would be Honeywell if there is a use proposed on Honeywell property, they own it, that use would fall on them or that change use, additional cover would fall on them.

LINDSAY SPEER: So if the County proposed anything in that area like you said. So you think it would be Honeywell, but you're not sure it would be Honeywell's cost?

TRACY SMITH: It could be the County, I guess. I think that would have to be determined in the future.

LINDSAY SPEER: Likely the taxpayers would have to pay for additional cover.

DON HESLER: I don't think there would be. The main point if there was a change to be proposed, it would have to

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be proposed and has to be approved by the DEC. Then whoever the party, would have to deter it. So if an area of one acre was identified for picnicking or soccer or whatever, then we would have to have a cover placed in that area. Would be protected is the bottom line.

LINDSAY SPEER: So right now the proposed plan is that you can have a parking lot or a trail across it, walking trail. To have a parking lot on the shore of the lake does not excite me.

MR. TRACY SMITH: Penn-Can area isn't on the shore of the lake.

LINDSAY SPEER: Why not do the remedy to the point you could have a picnic area without having to worry about cover. This is going to be considered park land. By putting the trail across it, people are going to consider it park land.

MR. TRACY SMITH: But if there is no use more than a passive recreational use, additional cover isn't necessary.

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If it's just going to be used as a bike trail, like 1 through 8, once a cover is protective for it.

LINDSAY SPEER: You're limiting it?

TRACY SMITH: No, if it changes then we place additional cover. But I don't think it's limited use at all.

LINDSAY SPEER: But the taxpayers may have to pay for that.

TRACY SMITH: I guess that would be determined in the future. I don't have a good answer for that right now, as Don just said.

HUGH KIMBALL: When would you expect the completion of the Record Of Decision, the ROD? And am I correct that you said that that record would include the answers to the questions raised today? The questions you already received and the ones you will receive through I hope an extended time period, but right now is August 24th?

MR. TRACY SMITH: Yes. We would. Any questions answered here and any received, they would be documented in there and we would respond to them in that document.

MAUDE MORSE: I live here in Solvay. My question is with Lindsey a little bit. I'm not doubting your technological capabilities, what I'm kind of disappointed in is that we're limiting our future. My vision of Onondaga Lake is, you know, a beach, a party, a wonderful asset to our community. I'm looking a hundred years down the road.

And to say that, right off the bat say we're going to have a parking lot and a trail, maybe bikes. That doesn't make any sense. We want to be able to kayak from Tully down Onondaga Creek into Onondaga Lake and have a picnic right there on the shore and have people sell hotdogs. To me, in my opinion, that's what we should be, you know, maybe we move there in shorter steps. But it is just going to cut you off when you say limited. I'm sorry.

DON HESLER: The only reason a parking lot was brought into this, a lot of interest in the Penn-Can property towards that end. That's really the only reason. If there wasn't an interest in that we wouldn't be talking about it.

MAUDE MORSE: I didn't mean to say it for that, I meant to say we're talking about limited use. Why limited use? Why not think about full potential use? This is our lake, Onondaga Lake, we're a lakefront community. We should be thinking way long term. Okay, thank you.

MR. TRACY SMITH: Noted. I appreciate your enthusiasm. Unfortunately we do have these hazardous waste sites located along the lakeshore which we have to address, a problem to take care of.

FRANK MOSES: Could you talk about some of the wetlands. They have to have

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restoration. That would be part of the remedy?

MR. TRACY SMITH: Right. So essentially we have a one acre wetland proposed with some buffer area along it. I assume that wetland would be an aquatic wetland with some deeper areas with some standing water throughout the year. Runoff from the site where covers are placed would be able to migrate or would basically flow to that wetland. So it would provide the water for the wetlands.

My best example would be once, the waste wall has been constructed, those are more than one acre wetlands have been constructed there, similar situation in placing lime materials down, make like a basin, place top soil and wetland soil in there and create a very nice wetland. So I think it's going to be a similar situation that would be constructed there, where you would have wetland constructed. They

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would be connected to the lake during high water flow areas. So any water, when you get over a certain water level in the lake probably 365 or so, water could come into those wetlands, fill them up and then go out as it's full. So that would be a benefit. You would have a semi-periodically lake-connected wetland. Any other question besides that or?

FRANK MOSES: Yes, are they designed in a way to support the species that are supported by Onondaga Lake?

TRACY SMITH: Yes, I think so.

FRANK MOSES: Similar to other wetlands?

TRACY SMITH: Yes, it would be similar to some other wetlands there. There's new wetland areas that have been created right adjacent with it. I know other wetlands, and they've mentioned some of the preliminary discussions for this one. The other wetlands have included some turtle spawning areas for

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laying eggs, I think those would be incorporated here. Other than that I mean I guess typical wetland vegetation would be anticipated. And you've got a really nice wetland in the outboard area already constructed; and have interaction with.

PEGGY CHASE: What was the water that will be caught behind the barrier. Is that contaminated?

TRACY SMITH: The groundwater that's captured behind the barrier wall is captured and sent for treatment at a treatment plant, which is located over here on Willis Avenue. That groundwater treatment plant collects all the water from the lakeshore site that Honeywell has, Semet Willis Waste Beds 1 through 8, this site, currently with the barrier wall. All that ground water is collected and treated. Any overflow of overland flow would be above the cap. So that would be considered clean water. Since it would be above the cover system.

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PEGGY CHASE: So after it's treated, what do you do with it? Is that like the Metro plant, it goes back into the lake?

TRACY SMITH: Some periodically. We sample it, they've got to meet all their discharge limits. All the contaminants are removed from the water before it's discharged back either to the lake or actually sometimes that water goes to Metro for a final ammonia treatment and then it's discharged to the lake. But it's treated and meets all the discharge limits before sent back out.

JASON NEWTON: I'm a local avid cyclist. And last year I signed a petition with over 200 other local cyclists in support of the bike trail expansion. And I just wanted to come today and give my support for the remedies and limitation to happen as soon as possible. We would love to have the bike trail.

MR. TRACY SMITH: I know that's one

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piece that hasn't been talked about a lot. But there is the bike trail. Talked a lot about it in the newspaper, not as quite as much in this remedy. But there is the bike trail proposed by the County to be constructed over this part of the site. I think that's included in the NRD for the Onondaga Lake system. So that construction will be paid for by Honeywell. Not really part of the remedial related, but.

MAUREEN CURTIN: I'm wondering to what extent does the recommendation reflect the concern of the Onondaga Nation, in your view?

MR. TRACY SMITH: Good question. I know they have significant concerns with the remedy. I know they usually push for a full removal alternative, similar to what they've done with the other remedy that's been proposed for the site.

We have consultation with the Onondaga Nation for all of the Onondaga Lake sites we work with. They have the opportunity to comment on any of the documents. They review the documents when we review documents. So they do have input. I can't say they always agree with us, but we try to work with them the best we can.

MAUREEN CURTIN: This is a point of information. Can you confirm that at different points in this process the Onondaga Nation has sort of de-coupled from the process? Because they feel like this is not adequate. That's not correct?

TRACY SMITH: No, they have not de-coupled from the process.

LINDSAY SPEER: How much have they incorporated in changing the document?

TRACY SMITH: I don't think -- I mean they've provided comments, and those will be addressed in the Record of Decision. We do provide comments -- or we do take their comments, we do respond to their comments. Any comment we receive from them we coordinate with them. Incorporated the best we can, I guess is the best I can say. We don't always agree, but we do try to listen to them and address concerns when we can.

LINDSAY SPEER: Is there anything the public can do to push for a better remedy or is this set?

TRACY SMITH: The thing is to provide public comment I guess. And if there is any -- Don or Bob, is there any?

BOB NUNES: That's the purpose of this meeting, for you folks to give input about the remedy and to provide feedback to us. So once we get that feedback, we consider that, and that's all included in the response summary and the Record of Decision. And once we have all that information, that's when DEC and EPA collect the remedy. So this is your opportunity to provide feedback to the regulatory agencies about the remedies. And if you think it should be changed or modified this is something we would listen to.

Tracy Smith Q&A

LINDSAY SPEER: Thank you, Bob, I'm aware of that and note that observing this decision-making process over many many years, DEC has never changed their remedy as far as I can remember, by any public comments.

BOB NUNES: I don't know if that's as fairly as you stated. We do get comments from the Onondaga Nation, we provide responses though those comments. And the information, we provide written responses on this proposal, we responded to those. And as part of that, the presentation regarding the information in the document, and we did incorporate new information to the document as per the comments.

LINDSAY SPEER: You improve the paperwork on the site and not an actual remedy is what I'm hearing you say.

BOB NUNES: In this case we may change the document. As far as whatever comments they had on substance of the remedy, and if it's something that has

Tracy Smith Q&A

merit, then we would change it accordingly. But that's --

LINDSAY SPEER: Have you included the Onondaga Vision for Future of Onondaga Lake in your consideration of the future use of the site? That's a document they issued.

MR. TRACY SMITH: Right. I read it.

BOB NUNES: What was the question?

MR. TRACY SMITH: Onondaga Nation Vision for Onondaga Lake, wondered if that has been incorporated into the document.

LINDSAY SPEER: With regards to anticipating uses.

MR. TRACY SMITH: That hasn't really been provided as comment to us, I don't think. If they provide it to us we'll consider it.

LINDSAY SPEER: I'll hand you a copy right now. So more questions. The DEC asserts that one to two foot cover will -- but the document also reports the first time, this document that

Tracy Smith Q&A

asphalt tanks buried under 4 feet of soil. And liner has risen to the surface on the Penn-Can property. The plan also says this whole like tar on the Penn-Can identified portion of the lakeshore around. Before the DEC can collect a remedy for the area, could you please determine how the tar like contaminants on the Penn-Can property are pushed through 4 feet of soil in the geo tech soil and whether there are similar contaminants in the area and whether the similar problems occur on the lakeshore area?

MR. TRACY SMITH: Similar tar material isn't present on the lakeshore area. We've already countered that type of tar there. We do have documentation that that tar was placed there during the decommissioning of the paving facility back in the late '70s, early '80s, which was covered as you mentioned.

Basically I think a lot of the migration of that tar may have happened

Tracy Smith Q&A

due to all the truck traffic during the Onondaga Lake Remedy, when some of the construction was ongoing with importing topsoil and other materials for the lake. They had 300 large trucks a day rolling through the site, possibly over that area where the tank bottom was located. We think that might have had a role to play in how that migration occurred upward.

So that's why the remedy states that we need to address that material either via removal, stabilization. We're going to perform the predesign investigation to address that material.

JESSICA BUMPUS: I have a question with regard to the considerations of EPA and DEC given climate change. And the oscillation between extremely wet and extremely dry years. And if that is going to change or alter the possible runoff of soil on that area?

TRACY SMITH: I think we tried to consider climate change. I know that

Tracy Smith Q&A

has been one of our -- considered during the remedies. Once a cover is established and we have good growth on it, we believe the place is pretty safe so you don't have to worry about the runoff. Maintenance would have to be performed on any covers to make sure we don't have too much erosion that might expose contaminated materials.

Once the cover is placed, it's considered established growth solution wouldn't be an issue, but that would be monitored to make sure we wouldn't have any exposed contaminated material. Yes, that's definitely a concern with the weather as we've seen recently. It would have to be incorporated in that. Any other questions?

JASON: I can see like 2, 3 and 4 are very much reasonable alternatives. But none of us find it reasonable for property owners to begin operating a hazardous material dump on a body of water for any amount of time, much less

Tracy Smith Q&A

in perpetuity.

I understand it's not a technical term. But popular understanding this is a larger process, the Onondaga Lake cleanup. And only Options 5 and 6 are actual cleanup options. The other ones are cover ups, literally.

MR. TRACY SMITH: All right.

BOB NUNES: That comment goes back to stuff we had earlier about the remedies in the way we select remedies and go through the evaluation criteria and weigh one against the other. And what he's saying is absolutely right, however the remedy, you actually remove all the contaminated material it would be much more difficult for the short term impact for the community while that's ongoing. It's far more costly to deal with. Much more difficult to implement. So you consider those things when you're providing remedies. And for that reason, that in our view, those remedies don't compare as well as the

Tracy Smith Q&A

preferred alternatives.

Okay, it is just putting cover material down, but what it does is eliminate exposure to human health and to wildlife. And by cutting off the exposure, so it's achieved, trying to show you that on the slide. So that's what I think that is. So probably trying to explain it to understand, it's not the same as removal material, but there is downside to removing material. And we have to consider those when we're considering the alternatives.

JASON: I think I understand all of that, but I think we might converge on our faith in certain constants we can expect in the future, and making the investment now immediately. Those investments now are going to pay off in the long term.

Because there are so many unknowns, even in the time frames, you are examining with this presentation, involving the problem rather than merely

Tracy Smith Q&A

kicking the can down the road, going to pay off for not me or possibly my children, but certainly to the health of the lake, the health of the city, the county, etc.

MR. TRACY SMITH: Unfortunately when you do that you create a problem somewhere elsewhere, that material you also have to contain.

LES MONTESSORI: Going back to Moses and some of these comments about cover versus cleanup or separation. Is there some sort of a biological know-how in terms of what is a safe cover for trees and roots and animals like woodchucks that are going to dig holes and things like that. You know, is a one or two foot cover enough to prevent those contaminants from creating recycling?

TRACY SMITH: New York State has soil cleanup objectives for ecological concern. And typically a two foot cover is what is used for ecological use for such as woodchucks and stuff like that.

Tracy Smith Q&A

I guess that would be applicable for trees also. Typically a two foot cover is used for ecological site uses I guess. This site, I don't know if it's necessarily ecological use in the consideration on the site, if it isn't used for the commercial use or like the walkway and stuff like that. Then a two foot cover in consideration of the ecological use area is an applicable use for the site.

Basically a two foot cover is, with the cover system that is proposed, it would, would allow trees to grow. We want to just keep it mowed. We don't want to have to just treat it like a landfill with a liner. There would be the ability for trees to grow around the lake. Any other questions?

MAUREEN CURTIN: I was just wondering if there is a chance of another hearing, if we can extend the comment period. Since this is kind of a ghost town in summer.

Tracy Smith Q&A

TRACY SMITH: Other public meetings I've had similar crowds I think actually. We are taking consideration of that.

MAUREEN CURTIN: I would encourage people to consider that. Last year we extended the public comment period, had a hearing at the Southwest Community Center, a hundred people were in the house that night. And over 40 people made comment. It went on for hours. I think people are very interested, I just think that many people are away. So I urge that you consider another hearing maybe more central possibly. I understand this is kind of local to this particular area of concern, but I'd love to see that. Thank you for considering that.

MR. TRACY SMITH: Right.

LINDSAY SPEER: So to fully clean up the site is about 1.3 billion, correct? This is much less than Honeywell's annual net profit. Like the record to show, I don't have more recent numbers at the moment, but according to their 2016 SEC filling, in 2014 they had over 40 billion in net sales, and net income of 4.3 billion. Honeywell can afford to do this.

BOB NUNES: Keep in mind. When we do a remedy evaluation, we do it with the idea that it's not clear who's paying. The responsible party or the state government or the federal government, so, we don't look at who has the money. That doesn't factor into how a venue is likely. We do by cost, we're not evaluating who's paying for it. In actuality we don't even know that, we can assume Honeywell will do that because they have done so for all the other sites to process. But presently they are not under a Consent Order to work with respect to this particular cleanup. So if we did select the remedy that would cost 1.3 billion, I would imagine Honeywell are not going to be

Tracy Smith Q&A

able to do that, but would be incumbent upon the state or federal government to pick up the cost.

MR. TRACY SMITH: Any other comments? Questions? Thank you. Thank you for the comments. And feel free to contact me if you have any other comments for the rest of the commentary. Thank you.

[Conclusion of Public Meeting/Comments].

* * * *

C E R T I F I C A T E

This is to certify that I am a Certified Shorthand Reporter and Notary Public in and for the State of New York, that I attended and reported the above entitled proceedings, that I have compared the foregoing with my original minutes taken therein and that it is a true and correct transcript thereof and all of the proceedings had therein.

_______________________

John F. Drury, CSR

Dated: August 20, 2018

**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-e**

**WRITTEN COMMENTS RECEIVED DURING THE COMMENT PERIOD**

## Smith, Tracy (DEC)

**From:** Alma Lowry <alma.lowry@gmail.com>
**Sent:** Monday, August 06, 2018 12:36 PM
**To:** Smith, Tracy (DEC)
**Cc:** Joe Heath; Adelaide Rosa; Jessica Shenandoah; Lindsay Speer; Curtis Waterman
**Subject:** Public Comment Period on Wastebed B/Harbor Brook Proposed Plan



Dear Tracy:

The Nation has received the notice of the public comment period on the Proposed Plan for Wastebed B/Harbor Brook and is preparing to submit its response. However, we are concerned about the timing of this comment period and believe that an extension is necessary.

The review and comment period falls almost entirely in August, which is a particularly difficult time to schedule public participation opportunities. Many people are on vacation or otherwise occupied during this month. The current timing will ensure that public attention to and engagement with this proposed plan is limited, regardless of public interest.

Given the importance of this parcel and its central position in the proposed Loop the Lake trail, we believe that the public must have adequate time to review the plan and raise any questions that they might have. For that reason, we request an additional 30 days be added to the public comment period.

Thank you for your consideration of this request. The Nation expects to file a more detailed set of comments before the close of the review period.

Sincerely,

Alma Lowry

--
Alma Lowry, Of Counsel
Law Office of Joseph Heath
General Counsel to the Onondaga Nation

## Smith, Tracy (DEC)

**From:** Dennis Connors <djconnors1973@gmail.com>
**Sent:** Tuesday, August 07, 2018 4:43 PM
**To:** Smith, Tracy (DEC); Kate Auwaerter
**Subject:** Waste Bed B/ Harbor Brook site Remedial Proposal



Ms. Smith

In examining the map published by Syracuse.com today, the accompanying article implies that the area outlined in red and identified as "Railroad Area" would be subject to this Honeywell remedial "coverage" project. I must point out that the Railroad Area would appear to encompass a City of Syracuse Protected Site documented as the stone remains of the Geddes District Brine Pump House, built in the mid-19th century by the State of New York. This site should not be compromised by any remedial action and any proposed construction activity in its environs should be reviewed by the Syracuse Landmark Preservation Board and its staff. I have copied the SLPB staff (Kate Auwaerter) on this e-mail.

Dennis Connors
2003 South Geddes Street
Syracuse, NY 13207

## Smith, Tracy (DEC)

**From:** Neely Kelley <neely.kelley@mothersoutfront.org>
**Sent:** Thursday, August 09, 2018 10:14 AM
**To:** Smith, Tracy (DEC)
**Subject:** Wastebed B/Harbor Brook at Onondaga Lake must be fully cleaned and restored

*ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.*

Dear Ms. Smith,

I am incredibly disheartened at the decision by the NYS DEC to simply cover up the toxic waste management site on the Western Shore of Onondaga Lake. This is a time when we (the people) desperately need leaders and decision makers such as the NYS DEC to stand firm and hold corporations, such as Honeywell, fully accountable for the environmental degradation and damage they have caused. The contaminated soil must be removed, not simply covered up, where it will remain a continued threat to public's health.

We are already seeing near irreversible damage done to our environment and environmental protections by the current Presidential Administration. The NYS DEC has the power to hold Honeywell accountable and responsible for a the most thorough and complete clean-up (removal of contaminated soil) and so I urge the DEC to do the right thing for this sacred lake - to right the wrong of such industrial damage and to ensure long-term environmental protection.

Require a full clean up and demand that Honeywell pay.

Thank you,

Neely Kelley

Neely Kelley
**New York State Senior Organizer**
**Mothers Out Front** -- ***Mobilizing for a Livable Climate***
585 451 9875
Follow Mothers Out Front on Facebook and Twitter

## Smith, Tracy (DEC)

**From:** Jenny Strandberg <jkstrandberg@gmail.com>
**Sent:** Thursday, August 09, 2018 1:35 PM
**To:** Smith, Tracy (DEC)
**Subject:** Clean Up the Onondaga Lake



Dear Ms. Smith,

I am VERY disappointed over the decision by the NYS DEC to cover up the toxic waste management site on the Western Shore of Onondaga Lake. You must hold corporations, such as Honeywell, accountable for the environmental degradation and damage they have caused!

Please take your responsibility and remove the contaminated soil by requiring a full clean up paid by Honeywell.

Thank you,

Jenny Strandberg

## Smith, Tracy (DEC)

**From:** lstam4@frontiernet.net
**Sent:** Thursday, August 09, 2018 2:06 PM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake clean up



*Dear Ms. Smith,*

*I was disheartened to hear about the decision by the NYS DEC to simply cover up the toxic waste management site on the Western Shore of Onondaga Lake. This is a time when we need leaders and decision makers such as the NYS DEC to hold corporations, such as Honeywell fully accountable for the environmental degradation and damage they have caused. The contaminated soil must be removed, not simply covered up, where it will remain a continued threat to public's health.*

*We are already seeing near irreversible damage done to our environment and environmental protections by the current Presidential Administration. The NYS DEC has the power to hold Honeywell accountable and responsible for a the most thorough and complete clean-up (removal of contaminated soil) and so I urge the DEC to do the right thing for this sacred lake - to right the wrong of such industrial damage and to ensure long-term environmental protection.*

*I believe the lake requires a full clean up and demand that Honeywell pay.*

*Thank you,*

*Laura Stam*

## Smith, Tracy (DEC)

| | |
|---|---|
| **From:** | Yayoi Koizumi <springchild74@gmail.com> |
| **Sent:** | Saturday, August 11, 2018 10:51 AM |
| **To:** | Smith, Tracy (DEC) |
| **Subject:** | Fwd: [sustainable_tompkins-l] Fwd: Onondaga Lake needs your help! PUBLIC COMMENT PERIOD |
| **Attachments:** | Onondaga WBB HB Proposed Plan Comments 5_8_18.pdf |



Hi,

I fully agree with the sentiments and facts expressed in the email below. Your proposed remedy for the Waterbed B/ Harbor Brook Site is woefully inadequate and inappropriate. I do not want to even mention the bureaucratic negligence /incompetence of scheduling the public comment period in August.  This is our environment, including yours, your family members and children, and their children, if you have any, and we need to all take good care of them. Please fight for it. That's what we entrust NYS DEC for.

Thank you,

Yayoi Koizumi

---------- Forwarded message ----------
From: **Lindsay Speer** <lindsayspeer@gmail.com>
Date: Wed, Aug 8, 2018 at 2:10 PM
Subject: [sustainable_tompkins-l] Fwd: Onondaga Lake needs your help! PUBLIC COMMENT PERIOD
To: Sustainability in Tompkins County <sustainable_tompkins-l@list.cornell.edu>

Dear Tompkins County friends,

Many of you know that I spent a lot of time over the years as part of the fracking fight and the (successful!) efforts to save Seneca Lake.  I now need to ask your help for the lake that needs as much love as the Finger Lakes.  It's hard for people in Syracuse to remember what a clean lake really looks like - and so people are often more willing to accept the minor progress towards remediation as enough.  While the Onondaga Nation remembers a clean lake, the rest of Syracuse - and the NYSDEC - generally suffers from a pollution Stockholm Syndrome up here.

Once again, the NYSDEC is about to sign off on a sub-standard remedy for a Superfund Site at Onondaga Lake. This is a rare opportunity for public comment on this travesty of a clean up. Please speak out and demand better, for the lake and for the future of our communities!

As you may have seen in the Post-Standard, Honeywell and the NYS Department of Environmental Conservation have announced their planned “remedy” for the Wastebed B / Harbor Brook site. **There will be a public hearing on Thursday August 16, 2018 at 6:00 PM (Open House from 5:00 – 6:00 PM) at the Geddes Town Hall Courtroom.** See the NYSDEC Fact Sheet  for more information on commenting. **Comments are due August 24th.** Submit to Tracy Allan Smith, Project Manager, NYSDEC tracy.smith@dec.ny.gov

**The Onondaga Nation's representatives wrote in their comments:**

*With the decision to designate Wastebed B/Harbor Brook and the adjacent In-Lake Waste Deposit Area as a "waste management area," the New York State Department of Environmental Conservation (NYS DEC) and the Environmental Protection Agency (EPA) appear to admit what the Onondaga Nation has maintained for years – that the Lake itself and many areas along its shorelines have been made into closed industrial waste landfills.*

*This is an affront to the sacred nature of Onondaga Lake. For this reason and to ensure long-term environmental protection, the contaminated materials within and around the Lake should be removed.*

The Wastebed B / Harbor Brook Superfund Site is located on both sides of I-690 at the south end of Onondaga Lake. Long time residents will remember a waste pipe from Allied Chemical's operations crossing the highway and dumping into the lake and on its shores. The worst of the pollution dumped in Onondaga Lake, known as the "In-Lake Waste Deposit" in official documents, is immediately offshore from this area.

**Key points:**

- **Parts of this site are highly toxic.**
  -
    - **PCBs and benzo(a)pyrene** were found at levels up to six times the allowable level for industrial areas.
    - **Mercury** was found at up to ten times the permissible industrial level.
    - **VOCs and SVOCs** were found in the soil and groundwater including benzene, toluene, ethylbenzene, xylene, dichlorobenzenes, naphthalene and phenols
    - **DNAPL, tar-like materials,** and stained soils are present at the site
- **This remedy condemns the southern end of the lake to forever be a "waste management area."** The waste will be left in place, covered by only 1-2' of soil. In some portions of the site, toxins from over 4' below ground have migrated to the surface.
    - **Cover thickness varies** across the site without clear justification, even in the area closest to the Lake that the public is likely to visit.
- **Onondaga County has plans to extend the West Shore Trail across this property.** The end use is designated parkland, which should include the ability for people to play frisbee, forage, fish, and picnic. The planned remedy is inadequate for these uses.

- To fully clean up the site, it would cost $1.3 billion. For reference, this is *much less* than Honeywell's annual *net* profit. They can afford it. **Instead, the proposed remedy is for the $12 million soil and asphalt cover remedy. This is a cover up, not a clean up.**
- When comparing remedies, **the draft plan fails to account for the cost of the long-term maintenance** of their preferred remedy, the "waste management area."
- **Public comment is poorly timed.** The sole public hearing and the bulk of the public comment period are slated for August, a time when many people are on vacation and when many community groups aren't meeting. DEC should extend the public comment period by an additional 30 days to ensure that the public has a real chance to consider and comment on this plan.

The Onondaga Nation consults with the DEC on a government-to-government basis, advocating for better remedies for Onondaga Lake's pollution. Their concerns about this site were largely dismissed by the DEC. I am sharing the Onondaga Nation's comments (attached) as a reference for those who like to make more technical comments.

Other relevant documents:
Relevant Documents:

NYSDEC Fact Sheet (2 pages)

Wastebed B/Harbor Brook Proposed Plan, July 2018 (PDF, 2.9 MB, 41 pages)

For those who like to dig into the technical weeds:

Human Health Risk Assessment for Wastebed B/Harbor Brook Site, Geddes and Syracuse- Oct. 2009(PDF, 133 pages, 1.9 MB)

Feasibility Study Report Wastebed B/Harbor Brook - Revised Final Report, July 2018 (PDF, 7.8 MB, 156 pages) Report only; appendices listed separately.

[Feasibility Study Report Wastebed B/Harbor Brook - Revised Final Report Appendices, July 2018 (PDF, 5.7 MB, 346 pages)](#) Appendices only; report listed separately.

Onondaga Lake deserves a better future. Thank you for helping advocate for it!

Lindsay Speer
Director, Creating Change
www.creatingchangeconsulting.com

Neighbors of the Onondaga Nation
Steering Committee member

315-383-7210
lindsayspeer@gmail.com

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**LAW OFFICE OF JOSEPH J. HEATH**
GENERAL COUNSEL FOR THE ONONDAGA NATION
ATTORNEY AT LAW
512 JAMESVILLE AVENUE
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315-447-4851
Facsimile
315-475-2465

May 9, 2018

Tracy Smith
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-0001
tracy.smith@dec.ny.gov

**Re: Draft Proposed Plan for Wastebed B/Harbor Brook**

Dear Tracy:

On behalf of the Onondaga Nation, I have reviewed the draft Proposed Plan for the Wastebed B/Harbor Brook subsite. I have the following comments regarding the proposed design and the public presentation of that design.

First, I must reiterate the Onondaga Nation's support for the complete removal of contaminated materials that have been dumped in and around Onondaga Lake rather than the DEC's preferred remedy of simply covering over these wastes and leaving them in place. Onondaga Lake is sacred to the Onondaga Nation. It is the birthplace and the center of the Haudenosaunee Confederacy. With the decision to designate Wastebed B/Harbor Brook and the adjacent In-Lake Waste Deposit Area as a "waste management area," the New York State Department of Environmental Conservation (NYS DEC) and the Environmental Protection Agency (EPA) appear to admit what the Nation has maintained for years – that the Lake itself and many areas along its shorelines have been made into closed industrial waste landfills. This is an affront to the sacred nature of Onondaga Lake. For this reason and to ensure long-term environmental protection, the contaminated materials within and around the Lake should be removed.

While DEC has taken pains to capture every potential cost of full removal of contaminated materials, the draft Plan fails to acknowledge, in similar detail, the costs created by the long-term commitment to maintaining closed industrial waste facilities in and around Onondaga Lake. The Plan does not explicitly discuss the long-term monitoring and maintenance required to ensure that the soil cover over these wastes remains complete. It does not estimate the period of time that groundwater collection capture and treatment systems will have to remain active. It does not address financial assurances or any other methods of holding Honeywell accountable to meet its monitoring, maintenance or remediation obligations in the future. The discussion of alternatives should give more consideration to the long-term costs of the "cover-up" alternatives (Alternatives 4 and 5), including the expenses that may be incurred to maintain an effective cover system and to capture contaminated groundwater for decades or more.

Second, the varying cover thicknesses proposed for the site and for the Lakeshore Area in particular are unwarranted. As described in the draft Plan and the prior Remedial Investigation for the site, essentially the entire Lakeshore Area (including AOS #1 and AOS #2) exceeds Soil Clean-Up Objectives (SCOs) for some designated uses and some contaminants (Remedial Investigation, § 2.3.1). Those portions of the Lakeshore Area that have already been "remediated" have consistently received two feet of soil cover. It's unclear why DEC would allow a one-foot soil cover in any portions of this site.

In addition, as DEC recognizes, most of the eastern portion of the Lakeshore Area (approximately 45 of 54 acres) has been designated as parkland (Proposed Plan, p. 7) and there are concrete plans to draw new visitors to the area with the extension of a hiking/biking trail across the entire site and enhanced fishing access at the western end (Willis Barrier Wall Habitat Scoping, Figure 1, March 2018; Canalways Trail Extension Project Phase II, Final Design Report, February 2018). DEC should ensure that the property can be used to the fullest extent possible compatible with this designation. Appropriate "park" uses may include the "passive recreational uses" that DEC appears to anticipate, such as hiking or biking on a paved trail through the property. However, many other uses, such as picnicking, fishing, foraging, or "pick-up" games of Frisbee or soccer are permissible and appropriate on parkland. DEC should not assume that these related and allowable uses will not occur in this area nor should it effectively preclude these uses with short-sighted remediation decisions. At the very least, DEC should require a two-foot soil cover or paved surfaces over the entire Lakeshore Area.

Third, it is concerning that DEC is relying on a simple soil cover to contain contaminants throughout most of the site, when the Proposed Plan also discusses the possible migration of contaminants through several feet of cover to surface soils in one of the areas to be remediated. Specifically, DEC notes the discovery of "localized areas of surficial tar material" (Proposed Plan, p. 4) on the Penn-Can property (i.e., tarry materials in surface soils) and later suggests that these "tar materials are potentially related to tank bottoms that were disposed on [sic] the site" (Proposed Plan, p. 12). According to DEC's own description, the tank bottoms referenced as the potential source of the surficial tar material were buried under two feet of soil covered by a geotextile liner and then an additional two feet of fill (Proposed Plan, p. 4). If, in fact, DEC is suggesting that contaminants from the tank bottoms have migrated upward through four feet of soil and a geotextile liner, some additional analysis or explanation is necessary to support the use of a one- to two-foot soil cover as complete containment for other contaminants on the same site.

Last, we are very concerned that the manner in which this site is discussed in the Proposed Plan and the selective presentation of data that may confuse – or, at least, fail to adequately inform – public readers. In some places, DEC's presentation minimizes potential risks and, in other places, focuses on unhelpful data that obscures the facts on the ground.

Specifically, the early emphasis on Solvay Waste (i.e., defining Solvay Waste as an "inert material" and defining "soil/fill" to mean Solvay Waste in footnote 1) may leave readers with the impression that there is limited contamination on site. Given the widespread presence of toxic materials unrelated to Solvay Wastes, it seems inappropriate to characterize the Wastebed B/Harbor Brook site as primarily as Solvay Waste disposal site or to couch the discussion of co-disposed waste as a mere potential (i.e., "Coke plant waste. . .may have been disposed of concurrent with the Solvay Waste" (Draft Plan, p. 3)). While DEC may not have records of the concurrent disposal of toxic materials with Solvay wastes, the contaminants found in the soil and groundwater on site surely demonstrate this fact. DEC should not downplay the presence of non-Solvay Wastes on site.

DEC uses other terms that are vague or don't reflect their commonly understood meaning. For example, DEC describes its preferred remedy as an "enhanced engineered cover system," despite the fact that the proposal is simply one to two feet of soil placed across the bulk of the site with a "low permeability liner" near one wetland site and some planting (Proposed Plan, pp. 18-19). It is difficult to see how this remedy involves engineering or enhancement. The Alternative should be described in terms that are more readily understandable and reflect reality – that is, a one- to two-foot soil cover. Similarly, DEC describes "long-term" monitoring, but is not explicit about time frame. Does "long-term" monitoring last for at least five years? At least fifty years? Clearer definitions would be helpful.

In some sections, DEC provides data that requires more context to be useful or informative. For example, DEC provides the range of contaminant concentrations within each sub-area of the site for those contaminants that exceeded SCOs, but never provides the standards to which those contaminant concentrations should be compared. As a result, the public will know that benzo(a)pyrene, mercury and PCBS (among other contaminants) were found at impermissible concentrations on the Lakeshore Area, but not that PCBs and benzo(a)pyrene were found at levels up to six times the allowable SCOs for industrial areas or that mercury was found at up to ten times the permissible industrial level. Readers will learn the highest and lowest levels found, but not the median level in each sub-area or the number of exceedances. The information regarding contaminant concentrations is only helpful in comparison to the relevant standards and to more complete statistical information on the contaminant levels found. Similarly, listing the amount of contaminated material that was removed from portions of the site as part of earlier remedial efforts is uninformative without information about the total amount of contaminated soil present or the level of contamination remaining post-remediation. DEC should ensure that it has provided sufficient information to allow the public to understand conditions on the site and evaluate the adequacy of the preferred alternative.

In some areas, DEC has left out potentially relevant information, failed to explain assumptions that seem relevant, or made seemingly contradictory statements. For example, DEC notes that the elevated Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) in the Lakeshore Area groundwater are related to "previous activities at the Penn-Can Property, Willis Avenue, and/or dredge spoils from the former East Flume and Onondaga Lake (western portion)" (Proposed Plan, p. 9). Although VOCs and SVOCs were also found in the surface and subsurface soils, the Proposed Plan does not discuss the source of these contaminants or whether contaminants likely moved in groundwater to the soil on site or from soil on site to the groundwater. If an explicit discussion of contaminant sources is helpful in the groundwater section, it should also be included in the surface and subsurface soil sections. As another example, in the Ecological Risk Assessment section, DEC describes risks to "aquatic organisms, fish and carnivorous birds" as "low to marginal" (Proposed Plan, p. 14), but provides no information on the level of risk for soil invertebrates, insectivorous birds or mammals. In another instance, DEC describes the site as comprising 78 acres, but then says that "the approximate 45-acre site is fenced" with no discussion of which portions are fenced or otherwise explaining this discrepancy (p. 3). DEC should be sure that it provides complete information with sufficient context to inform the lay reader.

Finally, we suggest that DEC use more lay-friendly language. For example, DEC describes groundwater collection trenches for "hydraulic control of impacted groundwater discharging to Harbor Brook" (Draft Plan, p. 6). This lingo-heavy sentence could be clarified by rephrasing as collection trenches to "capture contaminated groundwater before it enters Harbor Brook" or to "prevent contaminated groundwater from entering Harbor Brook." Similarly, DEC discusses the control of DNAPLs or NAPLs in this Plan (and defines the acronym), but never explains why DNAPLs/NAPLs are particularly problematic. The detailed description of the Interim Remedial Measures in the first few pages of the Proposed Plan and the subsequent untethered discussion of contaminant levels found on site is already likely to be off-putting to lay readers. Framing the discussion in more direct, lay-friendly language will be key to keeping the public reader engaged.

Thank you for your attention to these comments. We look forward to seeing the revised Proposed Plan for this site.

Sincerely,

*Alma L. Lowry*

Alma L. Lowry, Of Counsel
Law Office of Joseph J. Heath

cc: Council of Chiefs

## Smith, Tracy (DEC)

**From:** Elizabeth V. Keokosky <evk1@cornell.edu>
**Sent:** Wednesday, August 15, 2018 2:34 PM
**To:** Smith, Tracy (DEC)
**Subject:** Clean up of Superfund Site at Onondaga Lake

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hello,
I am a resident of Ithaca, NY and will not be able to get to the public hearing on this issue tomorrow but I just wanted to state my opinion as a comment.

The pollution and clean up of this lake has a long history which I can only read about and not fully know. But it is a sad and not uncommon situation, unique in one important way - this lake has a sacred meaning to one of NY's Indian tribes, the Onondagas.

We cannot make many things right for the tribes that were here before European settlers took the land, sold it, and resold it, made a profit and polluted it. But we can try to make this lake clean enough to be sacred again. It is something we owe ourselves as well as the Indians. And you cannot make a lake sacred with an asphalt liner.

Elizabeth

**From:** Abel R. Gomez <arg1989@hotmail.com>
**Sent:** Friday, August 17, 2018 12:40 PM
**To:** Smith, Tracy (DEC)
**Subject:** Public Comment: Onondaga Lake Clean-Up



Dear Tracy,
I am writing to you as a concerned resident of Syracuse and a PhD student at Syracuse University regarding the Honeywell and the NYS Department of Environmental Conservation have plan to deal with the Wastebed B / Harbor Brook site. I write to you in support of the Onondaga Nation's call for a more comprehensive cleanup of Onondaga Lake to do more than cover up the toxic waste. The plan as it stands does not take into account the longterm management of such waste. Instead, I affirm the requests sent by attorney Joseph Heath on behalf of the Onondaga Nation.
Best regards,
Abel

## Smith, Tracy (DEC)

**From:** Annabel Roberts-McMichael <arober10@syr.edu>
**Sent:** Saturday, August 18, 2018 11:44 AM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake West Shore Trail



Hi Tracy,
I'm a Syracuse resident, SUNY-ESF Masters Candidate and DEC Environmental Justice Office Intern. I wish to submit my comments to you as I am unable to attend the public comment period for the Onondaga Lake West Shore Trail because I am attending a conference. I believe the public comment period should be extended an additional 30 days as it is occurring at a time when many are out of town and many organizations are not meeting regularly.
Honeywell should spend the additional 1.3 billion required to dredge the site of contaminants. The proposed asphalt covering, while at a surface level offering straightforward recreation, is inadequate to prevent the continued leaching of contaminants into the water and does not reassure me as a resident who might wish to walk those trails, sit on the grass, gather edible or medicinal plants, or swim in the water.
I wish to express support, which I know is shared by my colleagues at ESF, for the will of Haudenosaunee and Onondaga Nation in determining the goals and metrics for what constitutes a clean and restored Onondaga Lake as it is a sacred site for them and is their home. Values beyond our US mainstream culture's recreation, and a more serious effort to hold the natural world as intrinsically valuable, is what I am looking for from DEC as a member of the public. This could be fulfilled by taking the initial step of removing the contaminants and fully remediating the area. It is beyond worth the time and money.
Thank you,
Annabel Roberts-McMichael
322 Westcott St
Syracuse, NY 13210

Masters Candidate, Teaching Assistant
Environmental Science, SUNY-ESF

## Smith, Tracy (DEC)

**From:** fishbugm5@twcny.rr.com
**Sent:** Monday, August 20, 2018 8:54 AM
**To:** Smith, Tracy (DEC)
**Cc:** Mat Webber
**Subject:** Extension of comment period

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hello Tracy,

I attended both your public presentations at the Geddes Town Hall and your telephone conversation with the Citizens Participation Working Group (CPWG) regarding proposed remedies for Wastebed B/Harbor Brook site.

The proposed remedies are pretty complex and also involve projects that vary widely in projected costs for implementation. As Vice President of the Izaak Walton League's Central New York Chapter, I would like to discuss the proposed remedial alternatives with our CNY Chapter members, and we will not have a meeting until the week after your public comment deadline on August 24.

I would like to request that the public comment period be extended for another month through September 24.

Sincerely,
Les Monostory
tel: 315-632-6058

# Smith, Tracy (DEC)

**From:** Karen Waelder <karenjkw@hotmail.com>
**Sent:** Tuesday, August 21, 2018 8:43 AM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake



As a nurse, a grandmother and a long time resident of Onondaga County I am deeply concerned about the prospect of capping the toxic waste in the Harbor Brook area.
The state of New York needs to represent the best interest of its citizens, not Honeywell, and Honeywell needs to clean up their mess.
Don't leave this lingering for my grandchildren.

Karen Waelder
Syracuse

## Smith, Tracy (DEC)

**From:** Leslie Noble <lnoble@syr.edu>
**Sent:** Wednesday, August 22, 2018 9:24 PM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake cleanup



Hello
Im writing to give my comment regarding waste-bed B Harbor brook area of Onondaga Lake. We have a real opportunity to hold a serial polluter accountable and restore Onondaga nation's sacred lake to health - Which would benefit all the people of Central NY. To do this right I oppose the current plan to cover up the waste bed and I'm calling on the state to

1) act on behalf of the people's interest, not Honeywell's
2) extend the public comment period (45 days, ideally)
3) hold another public hearing in the city, well publicized
4) commit to confront the problem now rather than kick it down the road

Please enter my comment into the record.
Thank you.
Leslie Noble

Sent from my iPhone

## Smith, Tracy (DEC)

**From:** Grim, John <john.grim@yale.edu>
**Sent:** Thursday, September 13, 2018 2:17 PM
**To:** Smith, Tracy (DEC); rsue@twcny.rr.com
**Subject:** Onondaga Lake comment



Dear Tracey Smith and Staff:

With the decision to designate Wastebed B/Harbor Brook and the adjacent In-Lake Waste Deposit Area as a “waste management area,” the New York State Department of Environmental Conservation (NYS DEC) and the Environmental Protection Agency (EPA) appear to admit what the Onondaga Nation has maintained for years – that the Lake itself and many areas along its shorelines have been made into closed industrial waste landfills.

This is an affront to the sacred nature of Onondaga Lake. For this reason and to ensure long-term environmental protection, the contaminated materials within and around the Lake should be removed.

Please accept my comment as an expression of concern for Onondaga Lake,

John Grim

John A. Grim
Forum on Religion and Ecology at Yale
Yale School of Forestry
and Environmental Studies, Rm 115
195 Prospect Street
New Haven, CT 06511

http://www.fore.yale.edu/
teilharddechardin.org
www.journeyoftheuniverse.org
www.emergingearthcommunity.org
thomasberry.org

## Smith, Tracy (DEC)

**From:** parkerhead@earthlink.net
**Sent:** Thursday, September 13, 2018 2:39 PM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake statement

*ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.*

Tracy Smith,
DEC
NY state,

I implore you to remediate the Waste Management area of Onondaga Lake, and not to cover it up. It must be cleaned up instead.
Please also plant trees in the adjacent area,
The public park for frisbee, etc. is not sufficiently "cleaned up" as of yet. It needs warning signs. It needs cleaning up.
The tribal nation of Onondaga deserve a clean lake; do not procrastinate, the money can be found in the budget.
Thank you,
Margaret Julie Finch
165 West 26th St. 5E
New York,
NY 10001
917-6133788

*Laura H Hewitt*
1711 West Warner Hill Rd, Ulster PA 18850
www.HewittFarms.org

13 September 2018

Tracy Alan Smith, Project Manager
NYSDEC
625 Broadway, 12th Floor
Albany, New York 12233-7013

Mr Smith:

Shall we let the fox repair the damage done to the chicken house he raided? Or perhaps just let him hide the damage by kicking loose feathers around to cover the bloody debris?

I am several generations removed from my Turtle Island ancestors, and due to the politics of the day, I am disconnected from them and the culture I should have learned from. None the less, I recognize and respect their RIGHTS, and THEIR land. As a US Citizen, I bear some responsibility in accounting for and recompensing them for the shameful actions of 'my' government. As such, I cannot sit silently by while the Department of Environmental Conservation (??!!!???) proposes the designation of Wastebed B/Harbor Brook and the adjacent In-Lake Waste Deposit Area as a "waste management area." FOR SHAME!!!!

The POLLUTORS should bear the responsibility of REMOVING the contaminated materials within and around the Lake, not be allowed to cover it with a blanket of soil. (how reminiscent of blankets of smallpox...)

For what little it matters to you, I am among those watching and waiting. I cannot imagine ANY valid reason NOT to seek a more balanced path, when they exist (ie: "**potential for reforestation** that could serve as a valuable natural habitat, and is an option that should be considered against the designated parkland use. ... remediated as **wetland habitat**. Expanding and strengthen previous remediation to wetland habitat to help turn it into a more robust ecological zone.")

Do I hang my head in shame again as an "American", or will you correct this wrong?

Laura H Hewitt

RECEIVED
SEP 18 2018
REMEDIAL BUREAU B

## Smith, Tracy (DEC)

**From:** Jay Leeming <leemingjay@gmail.com>
**Sent:** Friday, September 14, 2018 8:44 AM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake Needs a Full Clean-UP



Dear Tracy Smith,

I am getting in touch because I am concerned about Onondaga Lake. This lake needs a full clean-up, and no part of it should be designated as a "waste management area." The current draft plan does not solve the contamination problem in any lasting way.

We who live here need a full clean-up of this lake. Thank you for doing the difficult work of wrangling with these issues.

Sincerely,

Jay Leeming

# Smith, Tracy (DEC)

**From:** Alice McMechen <alicem@warwick.net>
**Sent:** Friday, September 14, 2018 1:51 PM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake - Wastebed B/Harbor Brook Remediation



Dear Tracy Smith,

First of all, thank you to the DEC for extending the comment period on this very important concern. I add my voice to those who advocate for complete remediation/toxic waste removal - not cover up, but *removal;* and full restoration of the ecological wholeness that was once the sacred lake Onondaga - wet lands, forest, and all. We can do no less in these times of challenge to Earth's functioning as an integrated system. Let us correct the short-sighted errors of our past actions wherever opportunity presents itself. Indeed, let us seek out opportunity.

Thank you.

Alice McMechen

## Smith, Tracy (DEC)

**From:** Marie Laing <marie.laing@mail.utoronto.ca>
**Sent:** Friday, September 14, 2018 2:55 PM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake



Hello there,

I am writing to voice my concern about the NYSDEC's proposed plan to 'remedy' the Wastebed B/Harbor Brook site. Using a soil and asphalt cover remedy for this site is, as the Onondaga Nation has pointed out, a grossly inappropriate measure. I urge you to take the Onondaga Nation's concerns seriously and have the courage to stand up to industry in order to ensure the health of the lake and shorelines for the generations to come.

Sincerely,
Marie Laing

**From:** Thomas LaClair <laclairt01@gmail.com>
**Sent:** Saturday, September 15, 2018 3:54 PM
**To:** Smith, Tracy (DEC)
**Subject:** Harbor Brook Clean Up



Dear Ms. Tracy Allan Smith, Project Manager, NYSDEC

I am very concerned about and invested in how Harbor Brook is cleaned up. It is very important that it is done sustainably. We must protect the future of Onondaga Lake for our future generations. I hope you agree :-)

Thank you,
Tom LaClair

## Smith, Tracy (DEC)

**From:** veronika soul <veronika.soul@gmail.com>
**Sent:** Sunday, September 16, 2018 5:01 PM
**To:** Smith, Tracy (DEC)
**Subject:** comments on Superfund Site at Onondaga Lake



Dear Ms.Smith,
I believe the NYS Department of Environmental Conservation's planned solution for the Superfund site at Onondaga Lake is far from adequate. The plan requires long-term management and it is not clear how this will be managed and paid for over many decades. It would be far better if the toxic site is totally cleaned up rather than just covered up. The payoff for the investment in cleaning up this highly toxic site is tremendous and will benefit people, the environment, and wildlife for generations to come. That is priceless. The NYS Department of Environmental Conservation has a rare opportunity to do some permanent good for this region and should not waste such an opportunity.
Once cleaned up, the area could be re-forested and made into a natural habitat. We now understand the value of restoring wetlands, so the existing wetlands could be expanded.
Furthermore, when companies take the liberty of spewing industrial toxins into nearby waterways while making huge profits and without any concern for the environment, it is imperative that we hold them responsible for cleaning up all the toxins they so carelessly deposited. The future of Onondaga Lake must be taken seriously and problem cannot be fixed with stopgap measures. The site needs to be properly cleaned up and the companies that caused this pollution must show some social responsibility by paying for a total clean-up.

Thank you for considering my comments.
With best regards,

Veronika Soul

## Smith, Tracy (DEC)

**From:** Emily Reid <emily-michelle@hotmail.com>
**Sent:** Sunday, September 16, 2018 9:27 PM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake/Harbor Brook CLEAN UP



Dear Ms. Smith,

Onondaga Lake should be a jewel to the City of Syracuse and the town of Liverpool. Instead years of industrial waste have turned it into a toxic site. The only thing holding Syracuse back from enjoying the success of other Finger Lakes cities, is the fact that Onondaga Lake is so polluted.

The longer that area is left to fester in chemicals and toxic heavy metals, the more harm it will cause Syracuse and it's citizens.

To make an analogy, if notice rust on your car, you can't just cover it up with paint. It will continue to eat away at the body of your vehicle. You have to take the time to do it right, sand the surrounding area down to clean steel, clean it, prep it, and properly paint and seal it. This takes time, effort, and a little more money. But if you don't do it right, you're dooming your car to corrosion.

Make Honeywell do it right. Clean it up! Don't cover it up!

Sincerely,

Emily Reid

Sent from my iPhone

September 12, 2018

RECEIVED
SEP 19 2018
REMEDIAL BUREAU B

Tracy Smith, Project Manager
NYSDEC
625 Broadway, 12th Floor
Albany, NY 12233-7013

RE: Remedy for Wastebed B/Harbor Brook Site

Dear Mr. Smith:

Based on discussions related to this State Superfund site at our Izaak Walton League Central New York Chapter meeting on August 28, we have the following comments on the proposed remedies for the Wastebed B/Harbor Brook site.

As described in the NYSDEC fact sheet for this approximately 90 acre site, Wastebed B is a former Solvay wastebed which received Solvay waste from about 1898 to 1926, while the Penn-Can property was historically used for the production and storage of asphalt products. The overall site is located just below the former Willis Avenue Chlorobenzene plant that manufactured a wide range of hazardous chemicals including benzenes, chlorobenzenes, toluenes, and xylenes, among others. Given the long term manufacturing history of the site, there is limited information on what amounts of chemicals were leaked or discharged either accidentally or purposefully into surface soils and ground waters between the chemical manufacturing plants and the Onondaga Lake shore.

We are also aware that the lakeshore area of Wastebed B that is presently owned by Honeywell International Inc. is planned to be utilized a few years from now as part of the Onondaga Lakeshore Trail, connecting the existing terminus of the eastern Lakeshore Trail with the Syracuse Inner Harbor vicinity. This entire Lakeshore Trail will be heavily used by the general public in coming years.

The remedies proposed for the Wastebed B/Harbor Brook site by NYSDEC include installation of a 1-foot thick soil/granular or asphalt cover in the Penn-Can Area, and placement of 1-2 feet of clean soil over contaminated sites along sections of Wastebed B. The contaminated subsoils will be left in place as a "waste management area" with the 1-2 feet of soil cover at an estimated cost of $19.1 million.

The Central New York Chapter is not calling for removal of all contaminated soils from Wastebed B at an estimated cost of $1.3 billion. Such a restoration project would take many years to implement and would simply move the contaminated wastes to a different site for treatment and disposal. However, we do have concerns over the proposed remedy for placing only 1-2 feet of clean soil material over the existing contaminated soils within the area of Wastebed B.

Given that NYSDEC is proposing a long term solution for remediation of this State Superfund Site, it is reasonable to anticipate that trees, vegetation, wildlife including birds, insects and animals will eventually become part of the environment at this lakeshore site. The wildlife will almost surely include woodchucks or groundhogs that are capable of tunneling under more than 1-2 feet of soil cover, thus exposing contaminated soils that can wash up on the land surface. Another question for NYSDEC is what plans or steps have been proposed to prevent erosion of the clean soil materials that are intended to be placed over contaminated soils within the Superfund Site?

Has the NYSDEC investigated, or are there any research studies available to determine what soil remediation measures would effectively reduce the hazards of contaminated soils being moved upwards onto the soil surface layers that will include rooting layers for vegetation and provide habitats for wildlife? Should the remediation plans consider placement of a greater volume of clean soil materials covering surface depths of 3-4 feet or more? We are not convinced that 1-2 feet of soil cover materials will be adequate to maintain an environmentally safe separation between surface vegetation & wildlife and the existing heavily contaminated soils that lie underneath within this State Superfund Site.

Very truly yours,

Les Monostory, V.P.,
Central New York Chapter, IWLA
125 Euclid Drive
Fayetteville, N.Y. 13066

## Smith, Tracy (DEC)


**From:** contlr14@aol.com
**Sent:** Monday, September 17, 2018 6:13 PM
**To:** beei@health.nyh.gov; Smith, Tracy (DEC)

**Subject:** Wastebed B/Harbor Brook Site 734075 Subsite of Onondaga Lake Site Comments



As an original and continuing member of the CPWG I wish to comment Draft Proposed Plan mostly with the idea that the public needs detailed and complete responses to questions raised previously by others including the letter dated May 9, 2018 from Alma L Lowery, Of Counsel, Law Office of Joseph J. Heath, General Counsel for the Onondaga Nation. I do **NOT** agree with their support for complete removal of contaminated material from the site as it ignores the difficulty, time, and incredible cost that would take as well as the likelihood of exposure to many people to the toxic materials.

However, I do think that there are many points raised in that letter that do need to be addressed thoroughly in the final plan and covered in detail in the ROD. I will cover some of those items from that letter in the order they appear therein. The plan does need to explain the long-term monitoring and maintenance that will be required to keep the soil cover over the waste and to make clear that the ground water collection capture and treatment systems will have to remain active for a very long (indefinite) period. The plan and the ROD should make clear what the plans are to hold Honeywell fiscally responsible to meet their many obligations well into the future.

Since there continues to be a flow of contaminants toward the Lake, DEC needs to explain how this flow is being kept from the Lake and from soil near the Lake. (I remember an explanation to the CPWG as to how a barrier or textile liner would prevent that and believe the plan should explain that fully including how stormwater is kept separate from ground water.) I also believe that this area is a much more dangerous area than Wastebeds 1 - 8 which primarily contain Solvay Waste which is basically inert and is covered fairly easily with a foot of soil and/or with a blacktop parking lot.

I think the future potential uses of this site (picnics,fishing, and other normal park uses) require more that a foot of soil and that the depth of clean soil coverage must be explained and defined depending on projected usage of the area. It is clear that there remains a considerable flow of contaminants to the area which is then collected and treated at the Willis Avenue plant. It seems that the draft plan perhaps does not emphasize enough the presence and dangers of the contaminants which are much more harmful than Solvay Waste.

I do agree with the letter from the Heath office that the term long-term monitoring needs to be made clearer in terms of numbers of years and/or of the conditions that would have to be found before such monitoring would be allowed to be reduced or to end. The risk to invertebrates, insects, and birds needs to be explained in detail in relation to the areas that are or will be fenced (and for how long) and those that will not required fencing. Maps should be included in the plan or the ROD.

In short, I am hopeful that all questions asked by the public in the comments you receive will be answered completely with adequate explanations that lay people can understand. I am pleased to have been a part of the CPWG and trust that our efforts have resulted in good and understandable information being made available to the public. The comments made here is to further that effort on this significant site. Thank you.


Hubert D. (Hugh) Kimball
8223 Dexter Parkway
Baldwinsville, NY 13027

## Smith, Tracy (DEC)


**From:** Anthony K <anthony0895@gmail.com>
**Sent:** Tuesday, September 18, 2018 8:55 AM
**To:** Smith, Tracy (DEC)

**Subject:** Wastebed B/Harbor Brook cleanup



Ms. Smith,

Good morning. I am writing to express my opinion regarding the planned cleanup of Wastebed B/Harbor Brook on the shore of Onondaga Lake. I am born and raised in the Syracuse area, and love visiting the shores of Onondaga Lake for recreation. I am very concerned that just 'covering' the contaminated area on the shore is not going to be a good long term plan. I would like to take any future children I may have for walks to see the beautiful sunsets on Onondaga Lake someday, and I would not like to increase my or anyone else's risk of getting cancer. This was noted in a syracuse.com article, which said "...people working or walking through the site would face cancer risks higher than allowed by federal law."

https://www.syracuse.com/news/index.ssf/2018/08/onondaga_lake_honeywell_cleanup_harbor_brook_mercury_onondaga_nation.html

Please have Honeywell revise their plans to include complete removal of the contaminated areas around the lake. This will ensure the future safety of people who would like to enjoy this beautiful asset we have in Syracuse.

## Smith, Tracy (DEC)

**From:** lpalmer9@twcny.rr.com
**Sent:** Tuesday, September 18, 2018 1:32 PM
**To:** Smith, Tracy (DEC)
**Subject:** Harbor Brook



Please, the Harbor Brook project needs to be completed fully. What has been proposed is "kicking the can down the road." An incomplete clean-up certainly sounds like what present generations inherited and is, willfully and without conscience, leaving for the generations to come!

## Smith, Tracy (DEC)

**From:** Amy Kallander <akalland@maxwell.syr.edu>
**Sent:** Tuesday, September 18, 2018 3:40 PM
**To:** Smith, Tracy (DEC)
**Subject:** full Harbor Brook clean up



Dear Tracy Allan Smith,

I am writing to encourage the NYSDEC to undertake a full clean-up of Harbor Brook/Wastebed B site to comprehensively address the extensive pollution dumped into Onondaga Lake and to reverse its detrimental impact on neighboring communities in general, and the Onondaga Nation in particular. This would include addressing the high levels of PCBs, benzopryene, and mercury in the water, additional chemicals found in soil and groundwater, and the presence of tar-like materials, towards their removal.

Though I live in Jamesville, we are part of a central NY community that enjoys and uses the lake, its parks and trails, and we all deserve the benefits of a toxin-free envornment, and not preserving parts of the lake as a "waste management area." Instead, I strongly encourage you to extend the West Shore Trail across this property to that the area improves access to green space and picnic areas for Syracuse residents and the entire Central New York community.

Best, Amy Kallander

**Amy Kallander**
Associate Professor, Middle East History
315.443.5883 akalland@maxwell.syr.edu
Department of History
145 Eggers Hall, Syracuse, NY 13244
Syracuse University

*Women, Gender, and the Palace Households in Ottoman Tunisia* https://utpress.utexas.edu/books/kalwom

## Smith, Tracy (DEC)

**From:** Mikayla Cleary-Hammarstedt <mjc218@lehigh.edu>
**Sent:** Wednesday, September 19, 2018 2:34 PM
**To:** Smith, Tracy (DEC)
**Subject:** Onondaga Lake Clean up



Hello Ms. Smith,

My name is Mikayla Cleary-Hammarstedt, I am a senior studying Environmental Engineering, Sustainable Development and Global Citizenship at Lehigh University and I have lived in Syracuse, NY my entire life. For a senior capstone I completed an extensive research project with my focal case study being Onondaga Lake remediation. Frankly, I was astounded by the lack of community engagement in the issue because it is so technical in nature. As I understand it there are still significant levels of pollution, but what is currently being proposed by Honeywell is a cover up of the southern end of the lake. By designating this land as a "waste management area" you are essentially giving up on ever fully cleaning up this once sacred site. I am DEEPLY concerned about the effect this will have on my community, especially if I too chose to start a family in Syracuse. I would love to hear from the engineers in charge of this project because I believe aspects directly contradict the code of ethics detailed by the American Academy of Environmental Engineers and Scientists.

Please let me know if there is any way I continue further in this conversation. Thank you for all the work that you do to keep our city safe.

Best,
Mikayla

## Smith, Tracy (DEC)

**From:** carol <cbuchove@twcny.rr.com>
**Sent:** Thursday, September 20, 2018 9:45 PM
**To:** Smith, Tracy (DEC)
**Subject:** Harbor Brook/Wastebed B Superfund Site at Onondaga Lake



I am vehemently opposed to the proposed "remedy" for the Harbor Brook/Wastebed B site. Poisons such as PCBs and mercury need to be CLEANED UP, not COVERED UP! How can 1-2' of soil even be considered to be okay, when toxins from over 4' below ground have already surfaced?!
We can't bury our heads or toxins in the sand. Make the polluters who made their money off of destroying this beautiful lake pay to CLEAN it.
Help give the areas adjacent a chance to do some good - make it all a wetland habitat. Give nature a small chance to thrive instead of having the most embarrassing crime against nature - the destruction of this lake and our willingness to hold onto the toxins, be such an unbelievably sad joke to the entire country, a sin if I've ever heard of one.
Carol Buchovecky
Syracuse, NY

# Smith, Tracy (DEC)

**From:** Celeste <celesteleah1982@gmail.com>
**Sent:** Sunday, September 23, 2018 2:21 PM
**To:** Smith, Tracy (DEC)
**Subject:** Harbor Brook/Wastebed B



I am vehemently opposed to the proposed "remedy" for the Harbor Brook/Wastebed B site. Poisons such as PCBs and mercury need to be CLEANED UP, not COVERED UP! How can 1-2' of soil even be considered to be okay, when toxins from over 4' below ground have already surfaced?! We can't bury our heads or toxins in the sand. Make the polluters who made their money off of destroying this beautiful lake pay to CLEAN it. Help give the areas adjacent a chance to do some good - make it all a wetland habitat. Give nature a small chance to thrive instead of having the most embarrassing crime against nature - the destruction of this lake and our willingness to hold onto the toxins, be such an unbelievably sad joke to the entire country, even to life itself.

Celeste Buchovecky
Onondaga County

**Smith, Tracy (DEC)**

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**From:** Hilary-Anne Coppola <hilcoppola@gmail.com>
**Sent:** Monday, September 24, 2018 11:02 AM
**To:** Smith, Tracy (DEC)
**Subject:** Harbor Brook Wastebed B- I demand a full-clean up of this site!



To the DEC project manager-
The proposed plan for the Harbor brook Wastebed B site is insufficient and will put human health at risk. Onondaga Lake and the City of Syracuse deserves better than this! No more ineffective remediation projects!

Parts of this site are highly toxic. PCBs and benzo(a)pyrene were found at levels up to six times the allowable level for industrial areas. Mercury was found at up to ten times the permissible industrial level. VOCs and SVOCs were found in the soil and groundwater including benzene, toluene, ethylbenzene, xylene, dichlorobenzenes, naphthalene and phenols. DNAPL, tar-like materials, and stained soils are present at the site

Your remedy condemns the southern end of the lake to forever be a “waste management area.” The waste will be left in place, covered by only 1-2’ of soil. In some portions of the site, toxins from over 4’ below ground have migrated to the surface. Cover thickness varies across the site without clear justification, even in the area closest to the Lake that the public is likely to visit.

Onondaga County has plans to extend the West Shore Trail across this property. The end use is designated parkland, which should include the ability for people to play frisbee, forage, fish, and picnic. The planned remedy is inadequate for these uses.

This site has potential for reforestation that could serve as a valuable natural habitat, and is an option that should be considered against the designated parkland use.Small portions of Onondaga Lake adjacent to this site have been remediated as wetland habitat. Expanding and strengthening this wetland would help turn it into a more robust ecological zone.

To fully clean up the site, it would cost $1.3 billion. This is much less than Honeywell's annual net profit. They can afford it. Instead, the proposed remedy is for the $12 million soil and asphalt cover remedy. This is a cover up, not a clean up. When comparing remedies, the draft plan fails to account for the cost of the long-term maintenance of their preferred remedy, the “waste management area.”

Public comment is poorly timed. The sole public hearing and the bulk of the public comment period are slated for August, a time when many people are on vacation and when many community groups aren't meeting. DEC should extend the public comment period by an additional 30 days to ensure that the public has a real chance to consider and comment on this plan.

Do the right thing and clean up Onondaga Lake and its surrounding habitat!

Hilary-Anne Coppola
Onondaga County resident
Environmental Educator

# Smith, Tracy (DEC)

**From:** Debby Webster <49boomers@gmail.com>
**Sent:** Monday, September 24, 2018 1:52 PM
**To:** Smith, Tracy (DEC)
**Subject:** Clean up Onondaga Lake



Would like consideration of full clean up of Wastebed B site. Proposed plan unacceptable for the protection of the people and the environment for the next seven generations.

**LAW OFFICE OF JOSEPH J. HEATH**
GENERAL COUNSEL FOR THE ONONDAGA NATION
ATTORNEY AT LAW
512 JAMESVILLE AVENUE
SYRACUSE, NEW YORK 13210-1502
315-447-4851
Facsimile
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September 24, 2018

Tracy Smith
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-0001
tracy.smith@dec.ny.gov

**Re: Proposed Plan for Wastebed B/Harbor Brook**

Dear Mr. Smith:

On behalf of the Onondaga Nation, I am submitting the following comments regarding the Proposed Plan for the Wastebed B/Harbor Brook subsite of the Onondaga Lake Superfund site. The Nation had the opportunity to consult with the Department of Environmental Conservation (DEC) during the development of this Draft Plan and has already expressed some of these concerns during that process. Because the Proposed Plan submitted for public review is not significantly changed from the previously reviewed draft, most of the Nation's earlier concerns remain valid and are repeated here.

The Nation has a unique cultural, spiritual, and historic relationship with Onondaga Lake. Nation leaders are mandated to act as stewards of the lake and its surrounding ecosystems. It was on the shores of Onondaga Lake that the Peacemaker brought the Five Nations together to form the Haudenosaunee Confederacy, under the Great Law of Peace. For centuries prior to the arrival of the colonists, the Nation's citizens lived on the Lake, fished it extensively and preserved it for future generations. To the Onondagas, the Lake is a living relative. The Nation has repeatedly expressed the need for a better and more complete remediation to restore the Lake and its shoreline to a clean and healthy state. The Preferred Alternative identified in the Proposed Plan for Wastebed B/Harbor Brook falls far short of this standard. DEC should either be significantly revise this Alternative or select a more protective option.

First, the Onondaga Nation reiterates its support for the complete removal of contaminated materials that have been dumped in and around Onondaga Lake, as reflected in Preferred Alternatives 5 and 6, rather than the Preferred Alternative of simply covering over these wastes and leaving them in place. By designating Wastebed

B/Harbor Brook and adjacent portions of the Lake as a "waste management area" and simply covering contaminants with soil, DEC and the Environmental Protection Agency (EPA) have committed Onondaga Lake to continued use as a closed industrial waste landfill. This is incompatible with and an affront to the Lake as a sacred space. For this reason and to ensure long-term environmental protection, the contaminated soils and buried wastes on the site should be removed to the extent possible.

With a complete removal of contaminants, this property could be restored to what was likely its original state – a mix of forest and wetlands across the entire site. The Nation strongly urges DEC to consider restoring this property to a natural forest/wetland. As a covered industrial waste landfill, this shoreline area will always have to be carefully managed. Deep-rooted trees that might disrupt the soil cover or natural wetland expansions that might intrude into the cover will have to prevented. As a result, the Harbor Brook area will be relegated to paved trails and relatively non-intrusive grass and shrub covers. The Nation urges DEC to consider real restoration of this property to its natural state and believes that, doing so, necessitates full removal of the abandoned industrial wastes on the site.

DEC considers waste removal in Alternatives 5 and 6 of the Proposed Plan, but dismisses these options as too costly. However, this analysis compares the cost of waste removal – which provides a permanent remedy with no required monitoring or maintenance – to the upfront costs of cover remedies. The long-term monitoring and maintenance required for the non-removal remedies are either ignored or greatly discounted in the Proposed Plan's cost analysis. DEC should give more consideration to the long-term costs of these "cover-up" alternatives, including the expenses that may be incurred to maintain an effective cover system and to capture contaminated groundwater for decades or more.

More importantly, the benefits of complete removal, including the potential to fully restore natural habitat and traditional uses of the site, should outweigh cost concerns. The permanent loss of a naturally revegetated site along with the expansive wetlands that were likely present here is also not incorporated into the cost-benefit analysis. This omission helps to explain the repeated preference for cover and containment strategies rather than removal and restoration plans.

Second, the Nation is alarmed that DEC is moving forward with this proposed plan despite the unexpected discovery of tarry waste materials in surface soils on the Penn-Can portion of the site in 2017. DEC suggests that this newly surfaced tarry material might be related to asphalt tank bottoms that were placed in a disposal pit and then buried under four feet of soil and a geotextile liner. The Proposed Plan also reports that "coal tar-like DNAPL," similar to material on the Penn-Can property, has been identified in portions of the Lakeshore Area. The Proposed Plan does not explain why tarry materials surfaced on the Penn-Can property or whether these tarry materials differ in any significant way from the materials on the Lakeshore Area.

Without a full understanding of what contaminants rose to the surface on the Penn-Can site and why, DEC cannot be certain that the far-thinner cover-based remedy proposed for other areas of the site will be adequate. This is a particular concern for the Lakeshore Area, which, as designated parkland with a planned walking/biking trail, is likely to attract significant public use. Before choosing an alternative under this Proposed Plan, DEC should determine how the tarry contaminants on the Penn-Can property were able to push through four feet of soil and a geotextile liner, whether there are similar contaminants or conditions in the Lakeshore Area, and how to prevent this problem from happening again on the Penn-Can site or from occurring on the Lakeshore area.

Third, the varying cover thicknesses proposed for the Lakeshore Area are not sufficiently justified. Portions of the Lakeshore Area that were remediated earlier were covered with 2 feet of soil. The Preferred Alternative, however, only mandates a 1-foot soil cover. Based on a review of the Remedial Investigation for the site, there appear to be no significant differences in degree of contamination between the previously remediated areas and the areas addressed by the Proposed Plan. DEC should directly address and justify the difference in proposed cover thickness based either on differences in contamination levels or differences in the allowed uses of these areas.

Rather than providing this explanation, DEC states simply states that, for the “passive recreational uses” reasonably anticipated across the entire Lakeshore Area, a one-foot thick soil cover will be protective enough. Even without the unexplained differences in cover thickness, the Proposed Plan does not provide enough information to justify this remedial choice.

Specifically, DEC does not explain or define the term “passive recreational use.” Instead, DEC gives a single example of a passive recreational use (“a walking trail”). Without a clearer definition of the term and some idea of the distinction between passive and active recreational uses, the public is left with no way to assess whether possible or anticipated uses of the Lakeshore Area should be considered passive recreation or whether a one-foot soil cover is likely to be enough to protect people engaged in passive recreation.

The Proposed Plan also provides no basis for the assumption that the Lakeshore Area will, in fact, be limited to a particular set of recreational uses. As DEC recognizes, the entire eastern portion of the site (approximately 45 of the 54 acres) is designated as public parkland. There are concrete plans to draw new visitors to the area with the extension of a hiking/biking trail across the entire site and enhanced fishing access at the western end. There appear to be no legal barriers to active uses of this publicly accessible property and DEC describes no physical barriers to such uses. Accordingly, DEC should assume that active recreational uses may occur and adjust the Preferred Alternative to require, at minimum, the 2-foot soil cover needed to protect such site uses.

Last, the Nation is concerned that the Preferred Alternative would cut off potential best uses of the Penn-Can and Railroad Areas within the site. In reviewing the significance of soil contamination in these areas, DEC only considered Unrestricted Use Standards and Industrial Use Standards. It then chose a remedy based on exceedances of Industrial Use Standards. However, given that industry on Onondaga Lake is on the decline and these properties are immediately adjacent to parkland, both sites are more likely to be redeveloped for commercial or recreational uses. Unless DEC can justify its assumption that neither site could reasonably be anticipated to be used for commercial or recreational purposes, it should select a remedy that would be compatible with the full range of possible or likely uses.

For all the reasons listed above, we urge DEC to reconsider its Preferred Alternative. And choose a full removal remedy instead. At minimum, if toxic wastes will be left in place on the site, we urge DEC to modify its Preferred Alternative to require a minimum of 2 feet of soil cover across the entire Lakeshore Area.

Sincerely,

*Alma L. Lowry*

Alma L. Lowry, Of Counsel
Law Office of Joseph J. Heath

cc: Council of Chiefs

**WASTEBED B/HARBOR BROOK SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-f**

**NYSDEC/EPA RESPONSES TO THE MAY 9, 2018 ONONDAGA NATION COMMENTS ON THE DRAFT WASTEBED B/HARBOR BROOK PROPOSED PLAN**

**Comment 1a**. First, I must reiterate the Onondaga Nation's support for the complete removal of contaminated materials that have been dumped in and around Onondaga Lake rather than the DEC's preferred remedy of simply covering over these wastes and leaving them in place. Onondaga Lake is sacred to the Onondaga Nation. It is the birthplace and the center of the Haudenosaunee Confederacy. With the decision to designate Wastebed B/Harbor Brook and the adjacent In-Lake Waste Deposit Area as a "waste management area," the New York State Department of Environmental Conservation (NYS DEC) and the Environmental Protection Agency (EPA) appear to admit what the Nation has maintained for years – that the Lake itself and many areas along its shorelines have been made into closed industrial waste landfills. This is an affront to the sacred nature of Onondaga Lake. For this reason and to ensure long-term environmental protection, the contaminated materials within and around the Lake should be removed.

***Response 1a. The designation of the Wastebed B/Harbor Brook Subsite and the adjacent In-Lake Waste Deposit Area as a "Waste Management Area" was made to identify the appropriate point of compliance for attainment of groundwater standards. Evaluations and decisions regarding the long-term management of contaminated areas, including whether contaminated materials should be removed or managed in-place, are performed in accordance with the NCP and EPA guidance, including providing an opportunity for public review and comment. For the Wastebed B/Harbor Brook Subsite, partial and full removal remedial alternatives were evaluated along with other alternatives. The partial and full removal alternatives would be significantly more difficult to implement, present significant short-term impacts, and are the least cost-effective means of achieving the objectives relative to the preferred alternative. For these reasons, NYSDEC and EPA have not identified either the partial or full removal alternative as the preferred alternative.***

**Comment 1b.** While DEC has taken pains to capture every potential cost of full removal of contaminated materials, the draft Plan fails to acknowledge, in similar detail, the costs created by the long-term commitment to maintaining closed industrial waste facilities in and around Onondaga Lake. The Plan does not explicitly discuss the long-term monitoring and maintenance required to ensure that the soil cover over these wastes remains complete.

***Response 1b. Cost estimates for long-term operation and maintenance of all components of the preferred alternative, as well as the other remedial alternatives that were evaluated, are provided in the FS Report.***

**Comment 1c.** It does not estimate the period of time that groundwater collection capture and treatment systems will have to remain active.

***Response 1c. Consistent with EPA guidance, present-worth operation and maintenance costs were calculated for a 30-year period. It is envisioned though that the groundwater collection and treatment systems will need to operate in perpetuity.***

**Comment 1d.** It does not address financial assurances or any other methods of holding Honeywell accountable to meet its monitoring, maintenance or remediation obligations in the future.

***Response 1d. Proposed Plans present a preferred remedy and the basis for that preference. NYSDEC and EPA identify preferred remedies without consideration of the entity (e.g., responsible party, government agency) that would perform the work. After the selection of a remedy for the site, should NYSDEC enter into an agreement with Honeywell for it to implement that remedy, it will be required to provide financial assurance, such as through a surety performance bond (or other mechanism), to demonstrate that it can complete the work described in the ROD.***

**Comment 1e.** The discussion of alternatives should give more consideration to the long-term costs of the "cover-up" alternatives (Alternatives 4 and 5), including the expenses that may be incurred to maintain an effective cover system and to capture contaminated groundwater for decades or more.

***Response 1e. See response above regarding cost estimates.***

**Comment 2a.** Second, the varying cover thicknesses proposed for the site and for the Lakeshore Area in particular are unwarranted. As described in the draft Plan and the prior Remedial Investigation for the site, essentially the entire Lakeshore Area (including AOS #1 and AOS #2) exceeds Soil Clean-Up Objectives (SCOs) for some designated uses and some contaminants (Remedial Investigation, § 2.3.1). Those portions of the Lakeshore Area that have already been "remediated" have consistently received two feet of soil cover. It's unclear why DEC would allow a one-foot soil cover in any portions of this site.

***Response 2a. Consistent with NYSDEC regulations and guidance, the placement of a one-foot cover would be appropriate for site areas where the current or anticipated future use is commercial or passive recreation. It should also be noted that the preferred alternative would achieve the requirements for containment under RCRA Subtitle D, which generally includes a two-foot cover system. Consistent with RCRA Subtitle D requirements, the State may approve an alternative final cover that achieves minimum permeability and erosion requirements. The type and thickness of the cover system in all site areas would be determined during the remedial design phase.***

**Comment 2b.** In addition, as DEC recognizes, most of the eastern portion of the Lakeshore Area (approximately 45 of 54 acres) has been designated as parkland (Proposed Plan, p. 7) and there are concrete plans to draw new visitors to the area with the extension of a hiking/biking trail across the entire site and enhanced fishing access at the western end (Willis Barrier Wall Habitat Scoping, Figure 1, March 2018; Canalways Trail Extension Project Phase II, Final Design Report, February 2018). DEC should ensure that the property can be used to the fullest extent possible compatible with this designation. Appropriate "park" uses may include the "passive recreational uses" that DEC appears to anticipate, such as hiking or biking on a paved trail through the property. However, many other uses, such as picnicking, fishing, foraging, or "pick-up" games of Frisbee or soccer are permissible and appropriate on parkland. DEC should not assume that these related and allowable uses will not occur in this area nor should it effectively preclude these uses with short-sighted remediation decisions. At the very least, DEC should require a two-foot soil cover or paved surfaces over the entire Lakeshore Area.

***Response 2b. As indicated above, the placement of a one-foot cover would be appropriate for site areas where the current or anticipated future use is commercial or passive recreation and would be consistent with NYSDEC regulations and guidance. The type and thickness of the cover system in all site areas would be determined during the remedial design phase based on the potential use (if active use is envisioned at the time of development of the design, it would be addressed then.). If the site use changes in the future this would be addressed by the site management plan and changes to the cover could be implemented.***

**Comment 3.** Third, it is concerning that DEC is relying on a simple soil cover to contain contaminants throughout most of the site, when the Proposed Plan also discusses the possible migration of contaminants through several feet of cover to surface soils in one of the areas to be remediated. Specifically, DEC notes the discovery of "localized areas of surficial tar material" (Proposed Plan, p. 4) on the Penn-Can property (i.e., tarry materials in surface soils) and later suggests that these "tar materials are potentially related to tank bottoms that were disposed on [sic] the site" (Proposed Plan, p. 12). According to DEC's own description, the tank bottoms referenced as the potential source of the surficial tar material were buried under two feet of soil covered by a geotextile liner and then an additional two feet of fill (Proposed Plan, p. 4). If, in fact, DEC is suggesting that contaminants from the tank bottoms have migrated upward through four feet of soil and a geotextile liner, some additional analysis or explanation is necessary to support the use of a one- to two-foot soil cover as complete containment for other contaminants on the same site.

***Response 3. The preferred alternative includes the incorporation of additional measures, such as stabilization and/or removal in the areas where surficial tar material is present, to prevent possible exposures to surficial tar. The specific areas where these additional measures may be implemented would be based, in part, on the findings of a supplemental investigation of the Penn-Can Area to determine the extent of surficial tar present.***

**Comment 4a.** Last, we are very concerned that the manner in which this site is discussed in the Proposed Plan and the selective presentation of data that may confuse – or, at least, fail to adequately inform – public readers. In some places, DEC's presentation minimizes potential risks and, in other places, focuses on unhelpful data that obscures the facts on the ground. Specifically, the early emphasis on Solvay Waste (i.e., defining Solvay Waste as an "inert material" and defining "soil/fill" to mean Solvay Waste in footnote 1) may leave readers with the impression that there is limited contamination on site. Given the widespread presence of toxic materials unrelated to Solvay Wastes, it seems inappropriate to characterize the Wastebed B/Harbor Brook site as primarily as Solvay Waste disposal site or to couch the discussion of co-disposed waste as a mere potential (i.e., "Coke plant waste. . .may have been disposed of concurrent with the Solvay Waste" (Draft Plan, p. 3)). While DEC may not have records of the concurrent disposal of toxic materials with Solvay wastes, the contaminants found in the soil and groundwater on site surely demonstrate this fact. DEC should not downplay the presence of non-Solvay Wastes on site.

***Response 4a. The discussion on the nature and extent of the contamination at the site is based on available information and includes a detailed description of dense non-aqueous phase liquids and stained soils present at the site.***

**Comment 4b.** DEC uses other terms that are vague or don't reflect their commonly understood meaning. For example, DEC describes its preferred remedy as an "enhanced engineered cover system," despite the fact that the proposal is simply one to two feet of soil placed across the bulk of the site with a "low permeability liner" near one wetland site and some planting (Proposed Plan, pp. 18-19). It is difficult to see how this remedy involves engineering or enhancement. The Alternative should be described in terms that are more readily understandable and reflect reality – that is, a one- to two-foot soil cover. Similarly, DEC describes "long-term" monitoring, but is not explicit about time frame. Does "long-term" monitoring last for at least five years? At least fifty years? Clearer definitions would be helpful.

***Response 4b. The reference to an "enhanced" cover in Alternatives 3 and 4 is to distinguish between the potential placement of a thicker cover (up to 2 feet thick) in the Lakeshore Area relative to a 1-foot-thick cover under Alternative 2. Consistent with the comment, references to an "engineered" cover have been removed from the description of the alternatives. Under the preferred alternative, long-term maintenance and monitoring would be implemented for as long as the cover system is needed.***

**Comment 4c.** In some sections, DEC provides data that requires more context to be useful or informative. For example, DEC provides the range of contaminant concentrations within each sub-area of the site for those contaminants that exceeded SCOs, but never provides the standards to which those contaminant concentrations should be compared. As a result, the public will know that benzo(a)pyrene, mercury and PCBS (among other contaminants) were found at impermissible concentrations on the Lakeshore Area, but not that PCBs and benzo(a)pyrene were found at levels up to six times the allowable SCOs for industrial areas or that mercury was found at up to ten times the permissible industrial level. Readers will learn the highest and lowest levels found, but not the median level in each sub-area or the number of exceedances. The information regarding contaminant concentrations is only helpful in comparison to the relevant standards and to more complete statistical information on the contaminant levels found. Similarly, listing the amount of contaminated material that was removed from portions of the site as part of earlier remedial efforts is uninformative without information about the total amount of contaminated soil present or the level of contamination remaining post-remediation. DEC should ensure that it has provided sufficient information to allow the public to understand conditions on the site and evaluate the adequacy of the preferred alternative.

***Response 4c. Standards/criteria for groundwater have been added to the text in the discussion of site groundwater in the Proposed Plan. Discussion of the nature and extent of contamination in all site media, along with the appropriate tables and figures that include standards/criteria, are included in the RI and FS Reports. Site characterization data and standards/criteria will also be included in tables and/or figures in the ROD. Attached are NYSDEC SCO tables which provide the SCOs for various types of site uses.***

**Comment 4d.** In some areas, DEC has left out potentially relevant information, failed to explain assumptions that seem relevant, or made seemingly contradictory statements. For example, DEC notes that the elevated Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) in the Lakeshore Area groundwater are related to "previous activities at the Penn-Can Property, Willis Avenue, and/or dredge spoils from the former East Flume and Onondaga Lake (western portion)" (Proposed Plan, p. 9). Although VOCs and SVOCs were also found in the surface and subsurface soils, the Proposed Plan does not discuss the source of these contaminants or whether contaminants likely moved in groundwater to the soil on site or from soil on site to the groundwater. If an explicit discussion of contaminant sources is helpful in the groundwater section, it should also be included in the surface and subsurface soil sections.

***Response 4d. As noted in the document, organic as well as mercury waste originating from the Main Plant and Willis Avenue facilities was conveyed to the site and the lake via the East Flume. Organics are also present as a result of the production and storage of asphalt tar materials on the Penn Can Property. These are the principal sources of VOCs and SVOCs at the site. Additional potential sources of VOCs and SVOCs include coke plant waste co-disposed with Solvay waste during the operation of Wastebed B as a settling basin and the placement of sewage sludge from the Syracuse Metropolitan Wastewater Treatment Plant on the southeast portion of the Wastebed.***

**Comment 4e**. As another example, in the Ecological Risk Assessment section, DEC describes risks to "aquatic organisms, fish and carnivorous birds" as "low to marginal" (Proposed Plan, p. 14), but provides no information on the level of risk for soil invertebrates, insectivorous birds or mammals. In another instance, DEC describes the site as comprising 78 acres, but then says that "the approximate 45-acre site is fenced" with no discussion of which portions are fenced or otherwise explaining this discrepancy (p. 3). DEC should be sure that it provides complete information with sufficient context to inform the lay reader.

***Response 4e. Additional clarifying text on ecological risks has been incorporated into the document. The text that refers to fencing on the property has been revised.***

**Comment 5.** Finally, we suggest that DEC use more lay-friendly language. For example, DEC describes groundwater collection trenches for "hydraulic control of impacted groundwater discharging to Harbor Brook" (Draft Plan, p. 6). This lingo-heavy sentence could be clarified by rephrasing as collection trenches to "capture contaminated groundwater before it enters Harbor Brook" or to "prevent contaminated groundwater from entering Harbor Brook." Similarly, DEC discusses the control of DNAPLs or NAPLs in this Plan (and defines the acronym), but never explains why DNAPLs/NAPLs are particularly problematic. The detailed description of the Interim Remedial Measures in the first few pages of the Proposed Plan and the subsequent untethered discussion of contaminant levels found on site is already likely to be off-putting to lay readers. Framing the discussion in more direct, lay-friendly language will be key to keeping the public reader engaged.

***Response 5. In response to the comment, revisions have been made to the document to incorporate more lay-friendly language. The revisions include the addition of a text box providing context for principal threat waste and NAPLs.***

**375-6.8** **Soil cleanup objective tables.**

(a) Unrestricted use soil cleanup objectives.

**Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives**

| Contaminant | CAS Number | Unrestricted Use |
|---|---|---|
| **Metals** | | |
| Arsenic | 7440-38-2 | 13 [c] |
| Barium | 7440-39-3 | 350 [c] |
| Beryllium | 7440-41-7 | 7.2 |
| Cadmium | 7440-43-9 | 2.5 [c] |
| Chromium, hexavalent [e] | 18540-29-9 | 1[b] |
| Chromium, trivalent [e] | 16065-83-1 | 30 [c] |
| Copper | 7440-50-8 | 50 |
| Total Cyanide [e, f] | | 27 |
| Lead | 7439-92-1 | 63 [c] |
| Manganese | 7439-96-5 | 1600 [c] |
| Total Mercury | | 0.18 [c] |
| Nickel | 7440-02-0 | 30 |
| Selenium | 7782-49-2 | 3.9[c] |
| Silver | 7440-22-4 | 2 |
| Zinc | 7440-66-6 | 109 [c] |
| **PCBs/Pesticides** | | |
| 2,4,5-TP Acid (Silvex) [f] | 93-72-1 | 3.8 |
| 4,4'-DDE | 72-55-9 | 0.0033 [b] |
| 4,4'-DDT | 50-29-3 | 0.0033 [b] |
| 4,4'-DDD | 72-54-8 | 0.0033 [b] |
| Aldrin | 309-00-2 | 0.005 [c] |
| alpha-BHC | 319-84-6 | 0.02 |
| beta-BHC | 319-85-7 | 0.036 |
| Chlordane (alpha) | 5103-71-9 | 0.094 |

Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives

| Contaminant | CAS Number | Unrestricted Use |
|---|---|---|
| delta-BHC [g] | 319-86-8 | 0.04 |
| Dibenzofuran [f] | 132-64-9 | 7 |
| Dieldrin | 60-57-1 | 0.005 [c] |
| Endosulfan I [d, f] | 959-98-8 | 2.4 |
| Endosulfan II [d, f] | 33213-65-9 | 2.4 |
| Endosulfan sulfate [d, f] | 1031-07-8 | 2.4 |
| Endrin | 72-20-8 | 0.014 |
| Heptachlor | 76-44-8 | 0.042 |
| Lindane | 58-89-9 | 0.1 |
| Polychlorinated biphenyls | 1336-36-3 | 0.1 |
| **Semivolatile organic compounds** | | |
| Acenaphthene | 83-32-9 | 20 |
| Acenapthylene [f] | 208-96-8 | 100 [a] |
| Anthracene [f] | 120-12-7 | 100 [a] |
| Benz(a)anthracene [f] | 56-55-3 | 1[c] |
| Benzo(a)pyrene | 50-32-8 | 1[c] |
| Benzo(b)fluoranthene [f] | 205-99-2 | 1[c] |
| Benzo(g,h,i)perylene [f] | 191-24-2 | 100 |
| Benzo(k)fluoranthene [f] | 207-08-9 | 0.8 [c] |
| Chrysene [f] | 218-01-9 | 1[c] |
| Dibenz(a,h)anthracene [f] | 53-70-3 | 0.33 [b] |
| Fluoranthene [f] | 206-44-0 | 100 [a] |
| Fluorene | 86-73-7 | 30 |
| Indeno(1,2,3-cd)pyrene [f] | 193-39-5 | 0.5 [c] |
| m-Cresol [f] | 108-39-4 | 0.33 [b] |
| Naphthalene [f] | 91-20-3 | 12 |
| o-Cresol [f] | 95-48-7 | 0.33 [b] |

Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives

| Contaminant | CAS Number | Unrestricted Use |
|---|---|---|
| p-Cresol [f] | 106-44-5 | 0.33 [b] |
| Pentachlorophenol | 87-86-5 | 0.8 [b] |
| Phenanthrene [f] | 85-01-8 | 100 |
| Phenol | 108-95-2 | 0.33 [b] |
| Pyrene [f] | 129-00-0 | 100 |
| **Volatile organic compounds** | | |
| 1,1,1-Trichloroethane [f] | 71-55-6 | 0.68 |
| 1,1-Dichloroethane [f] | 75-34-3 | 0.27 |
| 1,1-Dichloroethene [f] | 75-35-4 | 0.33 |
| 1,2-Dichlorobenzene [f] | 95-50-1 | 1.1 |
| 1,2-Dichloroethane | 107-06-2 | 0.02 [c] |
| cis -1,2-Dichloroethene [f] | 156-59-2 | 0.25 |
| trans-1,2-Dichloroethene [f] | 156-60-5 | 0.19 |
| 1,3-Dichlorobenzene [f] | 541-73-1 | 2.4 |
| 1,4-Dichlorobenzene | 106-46-7 | 1.8 |
| 1,4-Dioxane | 123-91-1 | 0.1 [b] |
| Acetone | 67-64-1 | 0.05 |
| Benzene | 71-43-2 | 0.06 |
| n-Butylbenzene [f] | 104-51-8 | 12 |
| Carbon tetrachloride [f] | 56-23-5 | 0.76 |
| Chlorobenzene | 108-90-7 | 1.1 |
| Chloroform | 67-66-3 | 0.37 |
| Ethylbenzene [f] | 100-41-4 | 1 |
| Hexachlorobenzene [f] | 118-74-1 | 0.33[b] |
| Methyl ethyl ketone | 78-93-3 | 0.12 |
| Methyl tert-butyl ether [f] | 1634-04-4 | 0.93 |
| Methylene chloride | 75-09-2 | 0.05 |

**Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives**

| Contaminant | CAS Number | Unrestricted Use |
|---|---|---|
| n - Propylbenzene [f] | 103-65-1 | 3.9 |
| sec-Butylbenzene [f] | 135-98-8 | 11 |
| tert-Butylbenzene [f] | 98-06-6 | 5.9 |
| Tetrachloroethene | 127-18-4 | 1.3 |
| Toluene | 108-88-3 | 0.7 |
| Trichloroethene | 79-01-6 | 0.47 |
| 1,2,4-Trimethylbenzene [f] | 95-63-6 | 3.6 |
| 1,3,5-Trimethylbenzene[f] | 108-67-8 | 8.4 |
| Vinyl chloride[f] | 75-01-4 | 0.02 |
| Xylene (mixed) | 1330-20-7 | 0.26 |

All soil cleanup objectives (SCOs) are in parts per million (ppm).

**Footnotes**

[a] The SCOs for unrestricted use were capped at a maximum value of 100 ppm. See Technical Support Document (TSD), section 9.3.

[b] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

[c] For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 1 SCO value for this use of the site.

[d] SCO is the sum of endosulfan I, endosulfan II and endosulfan sulfate.

[e] The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

[f] Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) with “NS”. Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.

(b) Restricted use soil cleanup objectives.

**Table 375-6.8(b): Restricted Use Soil Cleanup Objectives**

| Contaminant | CAS Number | Protection of Public Health | | | | Protection of Ecological Resources | Protection of Ground-water |
|---|---|---|---|---|---|---|---|
| | | Residential | Restricted-Residential | Commercial | Industrial | | |
| **Metals** | | | | | | | |
| Arsenic | 7440-38-2 | 16[f] | 16[f] | 16[f] | 16[f] | 13[f] | 16[f] |
| Barium | 7440-39-3 | 350[f] | 400 | 400 | 10,000 [d] | 433 | 820 |
| Beryllium | 7440-41-7 | 14 | 72 | 590 | 2,700 | 10 | 47 |
| Cadmium | 7440-43-9 | 2.5[f] | 4.3 | 9.3 | 60 | 4 | 7.5 |
| Chromium, hexavalent [h] | 18540-29-9 | 22 | 110 | 400 | 800 | 1[e] | 19 |
| Chromium, trivalent [h] | 16065-83-1 | 36 | 180 | 1,500 | 6,800 | 41 | NS |
| Copper | 7440-50-8 | 270 | 270 | 270 | 10,000 [d] | 50 | 1,720 |
| Total Cyanide [h] | | 27 | 27 | 27 | 10,000 [d] | NS | 40 |
| Lead | 7439-92-1 | 400 | 400 | 1,000 | 3,900 | 63[f] | 450 |
| Manganese | 7439-96-5 | 2,000[f] | 2,000[f] | 10,000 [d] | 10,000 [d] | 1600[f] | 2,000[f] |
| Total Mercury | | 0.81[j] | 0.81[j] | 2.8[j] | 5.7[j] | 0.18[f] | 0.73 |
| Nickel | 7440-02-0 | 140 | 310 | 310 | 10,000 [d] | 30 | 130 |
| Selenium | 7782-49-2 | 36 | 180 | 1,500 | 6,800 | 3.9[f] | 4[f] |
| Silver | 7440-22-4 | 36 | 180 | 1,500 | 6,800 | 2 | 8.3 |
| Zinc | 7440-66-6 | 2200 | 10,000 [d] | 10,000 [d] | 10,000 [d] | 109[f] | 2,480 |
| **PCBs/Pesticides** | | | | | | | |
| 2,4,5-TP Acid (Silvex) | 93-72-1 | 58 | 100[a] | 500[b] | 1,000[c] | NS | 3.8 |
| 4,4'-DDE | 72-55-9 | 1.8 | 8.9 | 62 | 120 | 0.0033 [e] | 17 |
| 4,4'-DDT | 50-29-3 | 1.7 | 7.9 | 47 | 94 | 0.0033 [e] | 136 |
| 4,4'- DDD | 72-54-8 | 2.6 | 13 | 92 | 180 | 0.0033 [e] | 14 |
| Aldrin | 309-00-2 | 0.019 | 0.097 | 0.68 | 1.4 | 0.14 | 0.19 |
| alpha-BHC | 319-84-6 | 0.097 | 0.48 | 3.4 | 6.8 | 0.04[g] | 0.02 |
| beta-BHC | 319-85-7 | 0.072 | 0.36 | 3 | 14 | 0.6 | 0.09 |
| Chlordane (alpha) | 5103-71-9 | 0.91 | 4.2 | 24 | 47 | 1.3 | 2.9 |

**Table 375-6.8(b): Restricted Use Soil Cleanup Objectives**

| Contaminant | CAS Number | Protection of Public Health | | | | Protection of Ecological Resources | Protection of Ground-water |
|---|---|---|---|---|---|---|---|
| | | Residential | Restricted-Residential | Commercial | Industrial | | |
| delta-BHC | 319-86-8 | 100[a] | 100[a] | 500[b] | 1,000[c] | 0.04[g] | 0.25 |
| Dibenzofuran | 132-64-9 | 14 | 59 | 350 | 1,000[c] | NS | 210 |
| Dieldrin | 60-57-1 | 0.039 | 0.2 | 1.4 | 2.8 | 0.006 | 0.1 |
| Endosulfan I | 959-98-8 | 4.8[i] | 24[i] | 200[i] | 920[i] | NS | 102 |
| Endosulfan II | 33213-65-9 | 4.8[i] | 24[i] | 200[i] | 920[i] | NS | 102 |
| Endosulfan sulfate | 1031-07-8 | 4.8[i] | 24[i] | 200[i] | 920[i] | NS | 1,000[c] |
| Endrin | 72-20-8 | 2.2 | 11 | 89 | 410 | 0.014 | 0.06 |
| Heptachlor | 76-44-8 | 0.42 | 2.1 | 15 | 29 | 0.14 | 0.38 |
| Lindane | 58-89-9 | 0.28 | 1.3 | 9.2 | 23 | 6 | 0.1 |
| Polychlorinated biphenyls | 1336-36-3 | 1 | 1 | 1 | 25 | 1 | 3.2 |
| **Semivolatiles** | | | | | | | |
| Acenaphthene | 83-32-9 | 100[a] | 100[a] | 500[b] | 1,000[c] | 20 | 98 |
| Acenapthylene | 208-96-8 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 107 |
| Anthracene | 120-12-7 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 1,000[c] |
| Benz(a)anthracene | 56-55-3 | 1[f] | 1[f] | 5.6 | 11 | NS | 1[f] |
| Benzo(a)pyrene | 50-32-8 | 1[f] | 1[f] | 1[f] | 1.1 | 2.6 | 22 |
| Benzo(b)fluoranthene | 205-99-2 | 1[f] | 1[f] | 5.6 | 11 | NS | 1.7 |
| Benzo(g,h,i)perylene | 191-24-2 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 1,000[c] |
| Benzo(k)fluoranthene | 207-08-9 | 1 | 3.9 | 56 | 110 | NS | 1.7 |
| Chrysene | 218-01-9 | 1[f] | 3.9 | 56 | 110 | NS | 1[f] |
| Dibenz(a,h)anthracene | 53-70-3 | 0.33[e] | 0.33[e] | 0.56 | 1.1 | NS | 1,000[c] |
| Fluoranthene | 206-44-0 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 1,000[c] |
| Fluorene | 86-73-7 | 100[a] | 100[a] | 500[b] | 1,000[c] | 30 | 386 |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | 0.5[f] | 0.5[f] | 5.6 | 11 | NS | 8.2 |
| m-Cresol | 108-39-4 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 0.33[e] |
| Naphthalene | 91-20-3 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 12 |

**Table 375-6.8(b): Restricted Use Soil Cleanup Objectives**

| Contaminant | CAS Number | Protection of Public Health | | | | Protection of Ecological Resources | Protection of Ground-water |
|---|---|---|---|---|---|---|---|
| | | Residential | Restricted-Residential | Commercial | Industrial | | |
| o-Cresol | 95-48-7 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 0.33[e] |
| p-Cresol | 106-44-5 | 34 | 100[a] | 500[b] | 1,000[c] | NS | 0.33[e] |
| Pentachlorophenol | 87-86-5 | 2.4 | 6.7 | 6.7 | 55 | 0.8[e] | 0.8[e] |
| Phenanthrene | 85-01-8 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 1,000[c] |
| Phenol | 108-95-2 | 100[a] | 100[a] | 500[b] | 1,000[c] | 30 | 0.33[e] |
| Pyrene | 129-00-0 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 1,000[c] |
| **Volatiles** | | | | | | | |
| 1,1,1-Trichloroethane | 71-55-6 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 0.68 |
| 1,1-Dichloroethane | 75-34-3 | 19 | 26 | 240 | 480 | NS | 0.27 |
| 1,1-Dichloroethene | 75-35-4 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 0.33 |
| 1,2-Dichlorobenzene | 95-50-1 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 1.1 |
| 1,2-Dichloroethane | 107-06-2 | 2.3 | 3.1 | 30 | 60 | 10 | 0.02[f] |
| cis-1,2-Dichloroethene | 156-59-2 | 59 | 100[a] | 500[b] | 1,000[c] | NS | 0.25 |
| trans-1,2-Dichloroethene | 156-60-5 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 0.19 |
| 1,3-Dichlorobenzene | 541-73-1 | 17 | 49 | 280 | 560 | NS | 2.4 |
| 1,4-Dichlorobenzene | 106-46-7 | 9.8 | 13 | 130 | 250 | 20 | 1.8 |
| 1,4-Dioxane | 123-91-1 | 9.8 | 13 | 130 | 250 | 0.1[e] | 0.1[e] |
| Acetone | 67-64-1 | 100[a] | 100[b] | 500[b] | 1,000[c] | 2.2 | 0.05 |
| Benzene | 71-43-2 | 2.9 | 4.8 | 44 | 89 | 70 | 0.06 |
| Butylbenzene | 104-51-8 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 12 |
| Carbon tetrachloride | 56-23-5 | 1.4 | 2.4 | 22 | 44 | NS | 0.76 |
| Chlorobenzene | 108-90-7 | 100[a] | 100[a] | 500[b] | 1,000[c] | 40 | 1.1 |
| Chloroform | 67-66-3 | 10 | 49 | 350 | 700 | 12 | 0.37 |
| Ethylbenzene | 100-41-4 | 30 | 41 | 390 | 780 | NS | 1 |
| Hexachlorobenzene | 118-74-1 | 0.33[e] | 1.2 | 6 | 12 | NS | 3.2 |
| Methyl ethyl ketone | 78-93-3 | 100[a] | 100[a] | 500[b] | 1,000[c] | 100[a] | 0.12 |

**Table 375-6.8(b): Restricted Use Soil Cleanup Objectives**

| Contaminant | CAS Number | Protection of Public Health | | | | Protection of Ecological Resources | Protection of Ground-water |
|---|---|---|---|---|---|---|---|
| | | Residential | Restricted-Residential | Commercial | Industrial | | |
| Methyl tert-butyl ether | 1634-04-4 | 62 | 100[a] | 500[b] | 1,000[c] | NS | 0.93 |
| Methylene chloride | 75-09-2 | 51 | 100[a] | 500[b] | 1,000[c] | 12 | 0.05 |
| n-Propylbenzene | 103-65-1 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 3.9 |
| sec-Butylbenzene | 135-98-8 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 11 |
| tert-Butylbenzene | 98-06-6 | 100[a] | 100[a] | 500[b] | 1,000[c] | NS | 5.9 |
| Tetrachloroethene | 127-18-4 | 5.5 | 19 | 150 | 300 | 2 | 1.3 |
| Toluene | 108-88-3 | 100[a] | 100[a] | 500[b] | 1,000[c] | 36 | 0.7 |
| Trichloroethene | 79-01-6 | 10 | 21 | 200 | 400 | 2 | 0.47 |
| 1,2,4-Trimethylbenzene | 95-63-6 | 47 | 52 | 190 | 380 | NS | 3.6 |
| 1,3,5- Trimethylbenzene | 108-67-8 | 47 | 52 | 190 | 380 | NS | 8.4 |
| Vinyl chloride | 75-01-4 | 0.21 | 0.9 | 13 | 27 | NS | 0.02 |
| Xylene (mixed) | 1330-20-7 | 100[a] | 100[a] | 500[b] | 1,000[c] | 0.26 | 1.6 |

All soil cleanup objectives (SCOs) are in parts per million (ppm).
NS=Not specified. See Technical Support Document (TSD).

**Footnotes**

[a] The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm. See TSD section 9.3.
[b] The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.
[c] The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm. See TSD section 9.3.
[d] The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.
[e] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.
[f] For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.
[g] This SCO is derived from data on mixed isomers of BHC.
[h] The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.
[i] This SCO is for the sum of endosulfan I, endosulfan II, and endosulfan sulfate.
[j] This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts). See TSD Table 5.6-1.